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11 NUMBER 12 DECEMBER 1985 **$2.95**

Creative Computing

THE #1 MAGAZINE OF COMPUTER APPLICATIONS AND SOFTWARE

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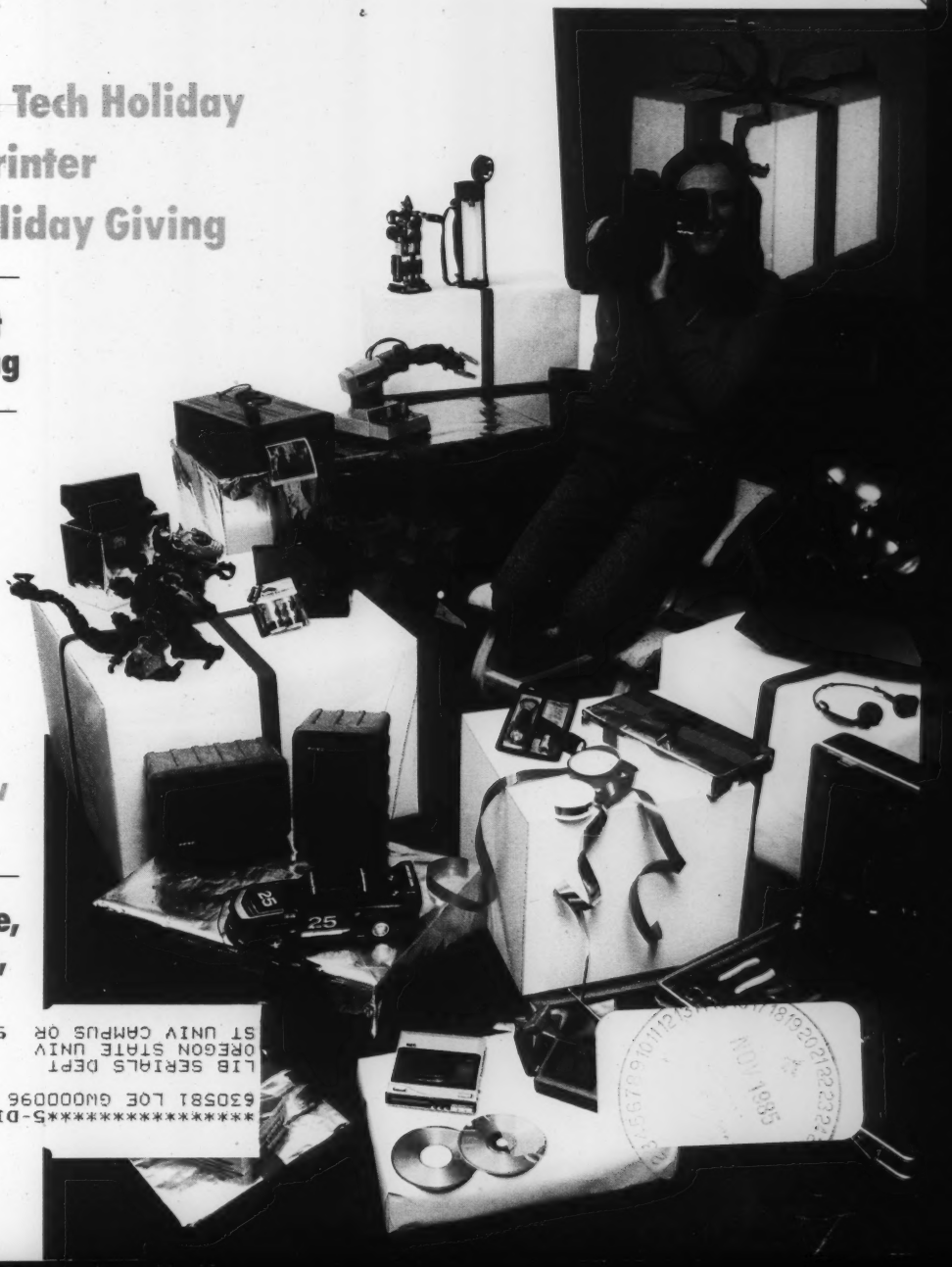

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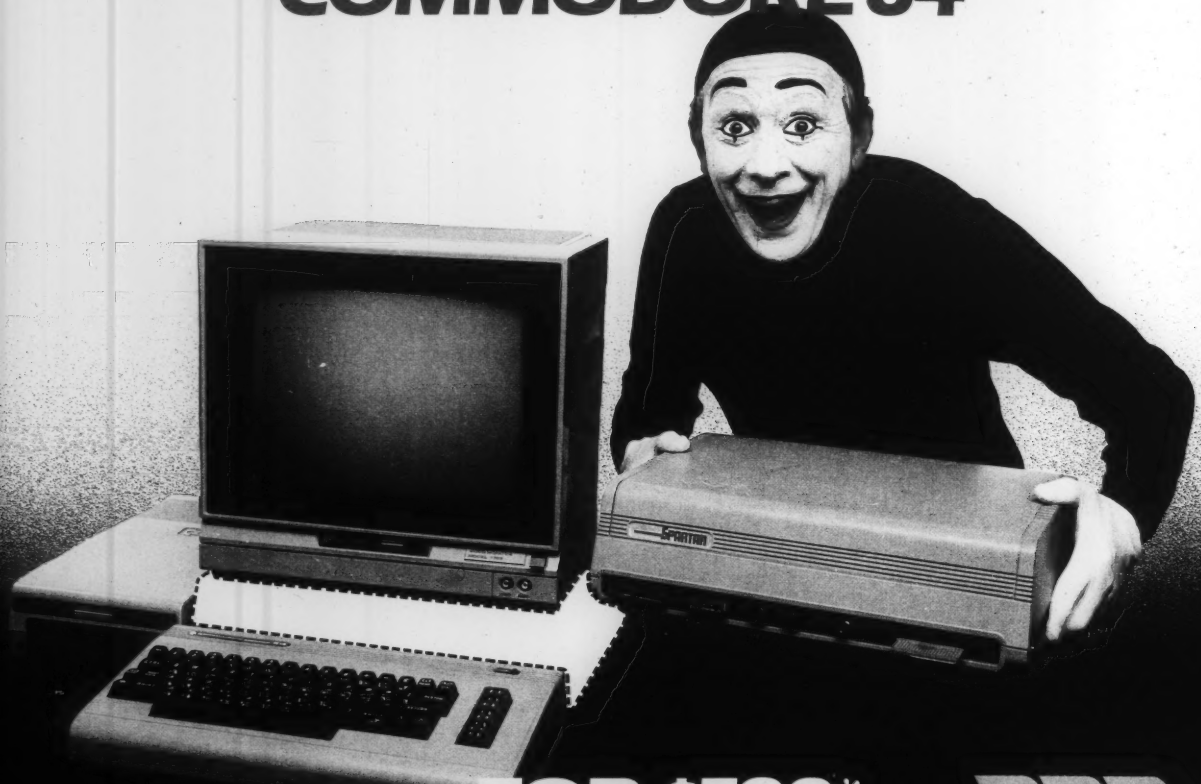

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Creative Computing (ISSN 0097-8140) is published monthly at 3460 Wilshire Blvd., Los Angeles, CA 90010 by Ahl Computing, Inc., a subsidiary of Ziff-Davis Publishing Company. David Ahl, President; Elizabeth Staples, Vice President; Selwyn Taubman, Treasurer; Bertram A. Abrams, Secretary. 39 East Hanover Ave., Morris Plains, NJ 07950. Second Class Postage paid at Los Angeles, CA 90052 and additional mailing offices.
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Subscriptions: Domestic: 12 issues $24.97; 24 issues $43.97; 36 issues $57.97. Canadian: add $5.00 per year. Foreign: add $10.00 per year. Foreign subscriptions must be accompanied by payment in U.S. currency. Airmail delivery on foreign subscriptions is available for a one-year period only at $75.00 additional for mail to Asia and Australia, and $50.00 additional for all other countries. Subscribers in the United Kingdom may send payment in sterling to Hazel Gordon, 10 Bishops Way, Sutton Coldfield, West Midlands B74 4XU. POSTMASTER: Send address changes to Creative Computing, P.O. Box 5214, Boulder, CO 80321. Please allow at least eight weeks for change of address. Call **(303) 447-9330** to order a subscription.

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Publisher: **William S. David**

One Park Avenue, New York, N.Y. 10016
(212) 503-5026

Assistant to the Publisher: **Jean Anderson**

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(212) 503-5030

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11 Davis Dr., Belmont, CA 94002.
(415) 598-2083

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One Park Ave., New York, NY 10016. (212) 503-5029

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James Yagi, IWAI Trading Company Ltd., 603 Ginza Sky Heights Building, 18-13, Ginza 7-Chome, Chuo-Ku, Tokyo, Japan 104. (03) 545-3908

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```
>CAST THE NITFOL SPELL ON THE DRAGON
```

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```
THE DRAGON PAUSES AND ROARS OUT
A BENEVOLENT GREETING, WHICH, TO
YOUR CHAGRIN, FRIES YOU TO A
DELICATE CRISP. YOU HAVE DIED.
```

Suppose, on the other hand, you decide to invoke a spell that quenches open flames:

```
>CAST THE GONDAR SPELL ON THE
DRAGON
```

In that case the story responds:

```
THE DRAGON'S FLAME IS
DOUSED IN A TORRENT OF
RUSHING WATER. IT
DISAPPEARS WITH A
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INPUT/OUTPUT

Legible Update

Dear Editor:

It was ever so nice to see my Legible Listings entry printed, but unfortunately, as soon as I saw it, I knew I had made a dreadful mistake. I must have enclosed a day old listing with my entry.

The version you printed will not list the last line of the program, as evidenced by the missing line 250 in the article. To correct this problem, change lines 130 and 220 as follows, and add line 250.

```
130 LINEINPUT#1,IL$:
    IFEOF(1)THENF=1
220 IFLC<LPORC$="C"ORC$="c"THEN
    IFF<>1THEN130ELSE240
250 LPRINTP$:
    LC=LC+1:
    RETURN
```

Sylvan D. Butler
225 Harvard Ave.
Rexburg, ID 83440

Bug in the Ice Cream

Dear Editor:

"Ice Cream Van" (Sept. 1985) has a troublesome bug. In the Sales Results section (lines 1740-1840) only the profit is added to the cash. For example: If I sell a banana split at $2.33, the program gives me only $1.38. But if I sell a banana split, I should get back my original investment ($.95) along with the profit. This is accomplished by changing the last statement in line 1770 from C=C+Z to C=C+Y.

Joe Vigil
MIS Manager
Avibank Mfg., Inc.
210 S. Victory
Burbank, CA 91503

Thanks Joe. Several readers noted this error. With it corrected, it should be considerably easier to "win" the game.—DHA

Wondrous Improvement Improved

Dear Editor:

In the August, 1985 Input/Output, Rodney D. Hixon gives an improved version of Wondrous Number Tester which eliminates some GOTOs from an earlier version. I think he may be interested in a method I sometimes use for avoiding GOTOs. Execution times may be increased significantly by GOTOs, especially in cases where the referenced line numbers occur far into a long program.

One way to avoid a GOTO is by using a dummy FOR/NEXT loop with STEP 0. Such a loop doesn't count anything, but it does give the return address for the loop, which can save time. Whether this approach is more aesthetic than the use of a GOTO depends upon one's individual taste, but it can be useful.

```
10 PRINT "*** WONDROUS NUMBER TE
STER ***"
20 FOR NUM=0 TO 1 STEP 0
30 PRINT
40 FOR ENTER=0 TO 1 STEP 0
50 INPUT"ENTER NUMBER TO BE TEST
ED";NUMBER
60 IF NUMBER<1 THEN NEXT ENTER
70 N=NUMBER
80 ITERATION=0
90 FOR TEST=0 TO 1 STEP 0
100 HALF=N/2
110 IF HALF=INT(HALF) THEN N=
HALF ELSE N=3*N+1
120 ITERATION=ITERATION+1
130 IF N>1 THEN NEXT TEST
140 PRINT ITERATION;"ITERATIONS
ARE NEEDED TO"
150 PRINT " MAKE";NUMBER;"WONDRO
US"
160 NEXT NUM
170 END
```

H. Bruce Phillips
450 Seneca Lane
Bolingbrook, IL 60439

Cracking Coconuts

Dear Editor:

Using Diophantine analysis to solve the coconut problem ("Coconuts of Diophantus," Carl Patterson, October 1985), is equivalent to using a sledge hammer to swat a fly. Using the problem solving strategy *working backward*, this coconut problem can be cracked in four seconds with a light tap from the following ten line program.

A complete analysis of a slightly different version of this problem appeared in the article, "Thinking Strategies with the Computer: Working Backward," in the May/June 1977 issue of *Creative Computing*.

```
10 PRINT "CRACKING COCONUTS"
20 Y=Y+1
30 IF 5*Y/4 <> INT(5*Y/4) THEN 20
40 N=0
50 X=5*Y/4
60 IF (5*X+1)/4 <> INT((5*X+1)/4) THEN 20
70 X=(5*X+1)/4
80 N=N+1
90 IF N<4 THEN 60
100 PRINT 5*X+1;"TOTAL COCONUTS ";
    Y;"LAST SHARE."
```

This problem can also be analyzed using a spreadsheet (below). Using the Data Fill command, three formulas, and the Copy command, one can easily pick out the only possible solution for the Total and Last Share in any specified range.

A solution exists at any row that displays all integers. Row 205 displays the integers 204, 255, 319, 399, 499, 624 and the total number in the pile 3121. The number 204 is the last share of coconuts they all received and 255 through 624 correspond to the shares the fifth through first man receives.

Donald T. Piele
University of Wisconsin-Parkside
Kenosha, WI 53141

	A	B	C	D	E	F	G
1	Last Share	5th	4th	3rd	2ed	1st	Total
2	1	5*A2/4	(5*B2+1)/4				5*F2+1
3	2						
4	3						
.	.						
(A solution) 205	204	255	319	399	499	624	3121
.	.						
501	500						

Instructions: Date Fill the range A2..A501 with consecutive integers.
Copy cell C2 into the range D2..F2.
Copy the range B2..G2 into the range B3..G501.

Correction: Spectravideo Not a Chapter 11 Case

Spectravideo, Inc. never entered Chapter 11 as reported in our October, 1985 issue (sidebar to the review of the Bondwell 2). Rather, the company elected voluntarily to restructure its debt on the initiative of Bondwell, which eventually took over the company. The problem stemmed from product delivery problems with Spectravideo's first two computers, the SV318 and SV328.

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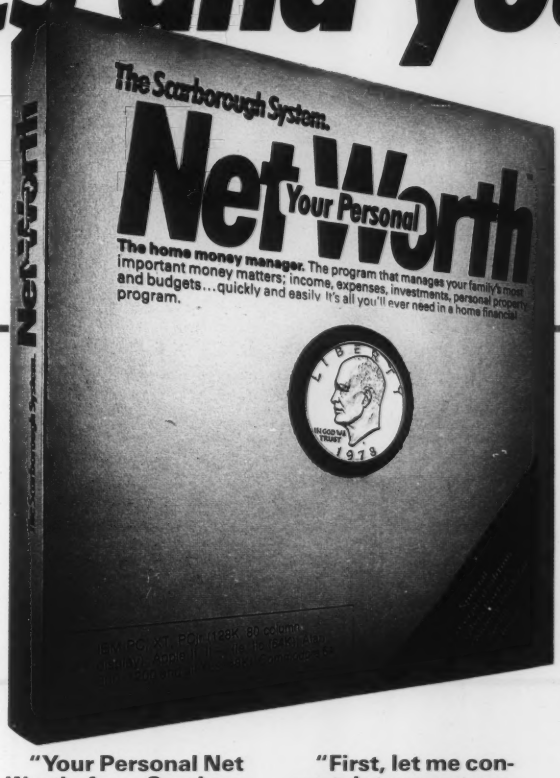
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CIRCLE 123 ON READER SERVICE CARD

EDITORIAL

Great while it lasted/**David H. Ahl**

Faced with mounting losses and declining advertising pages, Ziff-Davis has decided to cease publication of *Creative Computing*. We are hoping to find a buyer for the magazine; if none is found this will be the last issue. (The balance of your subscription will be fulfilled with a computer magazine of your choice.)

Creative isn't the first magazine to disappear, and it certainly won't be the last. In a sense, the demise of various computer magazines simply reflects what is happening to the industry as a whole.

The personal computing industry is largely composed of adolescent companies and inexperienced managers being forced to grow up much too fast by market forces that they themselves created. The big guys are sailing in with battleships, and the friendly competition of a few years ago has become all out war with no holds barred. The media smell blood and death which make for lively reading (and sales); their alarmist disaster stories have simply exacerbated the situation.

Before we get caught in the hype or the doom, let's take a sober look at the dominant trends in the personal computing industry today.

•More sophisticated customers. In the broadest sense, the market can be divided into two pieces: people who have computers and those who don't. Those who do have computers tend to be technically knowledgeable when they shop for peripherals, software, and additional computers. When they shop for replacements for their current machines they are looking for a certain amount of compatibility—particularly if they have a large investment in data files.

On the other hand, people who don't have computers are looking for user friendliness of a sort that just isn't available today. You can rent a car virtually anywhere in the world and in a minute or two be familiar enough with the vehicle and local traffic laws to drive off with a reasonable degree of confidence. When it is that easy to use a computer, then manufacturers can legitimately speak of user friendliness; we are a long way from that point today.

As a result of being confronted with machines that manufacturers call user friendly but in reality are user hostile, new customers are staying away from computers in droves. The current market

is composed largely of people who have computers and who are much smarter in their buying the second and third time around. Thus many companies with marginal products are going out of business, and new companies with average products aren't even getting to first base.

•Enormous cost of entry. To introduce a new product today costs several orders of magnitude more than it did just four of five years ago. Xanaro reportedly is spending $4 million on a marketing campaign to introduce *Ability*, an integrated software package. Sevin-Rosen reportedly invested $8 million in the developers of *Paradox*, a database package. This is more than ten times the amount they invested in Lotus a few years ago—which was, in turn, ten times more than the makers of *VisiCalc* started with in 1978.

IBM's advertising budget is about $550 million; Apple's is $175 million; and eight other companies in the field have ad budgets of more than $40 million per year. Thus for a new company to challenge the leaders, it must seek financing far in excess of what the average venture capital firm is willing or able to invest.

•Confused marketing. Some companies pack ads with mind-numbing technical jargon. Others stress product benefits, while still others flirt with vague image building approaches. Bad as these confused advertising approaches are, it is in media buying (where the ad appears—TV, magazines, newspapers) that confusion is really rampant.

Typically, media placement decisions in an ad agency are made by a junior person—sometimes even by a computer. Conventional wisdom says ads should be placed in publications with the lowest cost per thousand readers. Very little, if any, attention is paid to the content of the publication or, even worse, whether or not the ad actually sells. Follow-up studies are virtually nonexistent. What little research is done is done by the magazines themselves, a situation akin to getting advice on buying a Toyota from the Ford dealer across town.

•Self-fulfilling prophesies. Given the dearth of decent research, manufacturers, investors, and even customers have come to rely upon the general business press to an unprecedented extent for information about the computer industry. Hence, *The Wall Street Journal, New York Times, Fortune, Business Week*, and similar publications are now in the position of not just reporting the news, but actually defining the industry.

Thus, reporters with very tight deadlines and frightfully little inclination to understand technical products and users are calling the shots. If the *Times* talks about checkbook balancing and recipe files in a piece about the home market, managers and investors believe it. As a result of this erroneous image created by the press most companies don't take the home market seriously, ignoring the reality that most home users are a well-heeled lot who do much the same things with their home computers that business users do—word processing, database management, analysis with spreadsheets, and programming.

Bill Machrone, editor of *PC* magazine, recently asked a reporter for *The Wall Street Journal* if he realized the

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CIRCLE 106 ON READER SERVICE CARD

enormous influence his newspaper had on the industry. He pooh-poohed the notion and insisted that the paper was simply reporting the news.

Combine all of these things—increasingly sophisticated customers, confused marketing, high cost of entry, and lack of research, and it is not difficult to understand why the industry is tripping over its own feet. Other important factors include the enormous might of IBM, desperation tactics of companies (and magazines) on the rocks, periodic price wars, and a naive belief on the part of many managers that their products really are user friendly.

My prediction is that the industry is unlikely to emerge from the doldrums for several years, but when it does it will be more knowledgeable, more secure, and better able to take the strides necessary to grow in our increasingly information-oriented society.

A Brief Obituary

Some things you might want to remember about *Creative Computing*: it was the first personal computing magazine, publishing its first issue in November 1974, nine months before *Byte*. *Creative* published the first articles about interactive videodiscs (March 1976) and the first interactive computer/videodiscs program (January 1982). We published the first comparison of sorting techniques (November 1976) and the only valid comparative computer benchmark test (1981-85).

Our biggest issue was December 1982 (430 pages), and our smallest was the first issue, November 1974, with 48 pages. We have the longest running Apple, Tandy, and Commodore columns of any magazine (all started November 1978) and the longest running book reviews column (since January 1975).

In our heyday, we published four magazines in addition to *Creative—Sync* (for Sinclair users), *Microsystems, Small Business Computers*, and *Video & Arcade Games*, as well as two annual buyer's guides to hardware and software. Creative Computing Press published 42 books including my *Basic Computer Games*, the first computer book to sell over one million copies. Creative Computing Software published over 100 titles, including such notables as *Space Invaders* and *Original Adventure*.

We operated a hardware distributor, Peripherals Plus, which sold some of the most innovative peripherals available at the time. Our consulting division developed much of the software for the Sesame Place theme parks, and worked with scores of schools and museums on many projects.

Where Are We Now?

As I said at the outset, we hope a buyer can be found for the magazine. If not, I'll be available for presentations, consulting, and other projects at 12 Indian Head Road, Morristown, NJ 07960. Betsy Staples is also available for writing and consulting at 119 Maple Ave., Morristown, NJ 07960.

All correspondence relating to *Creative Computing* should be directed to the appropriate person at Ziff-Davis (see bottom of masthead) at One Park Ave., New York, NY 10016. ■

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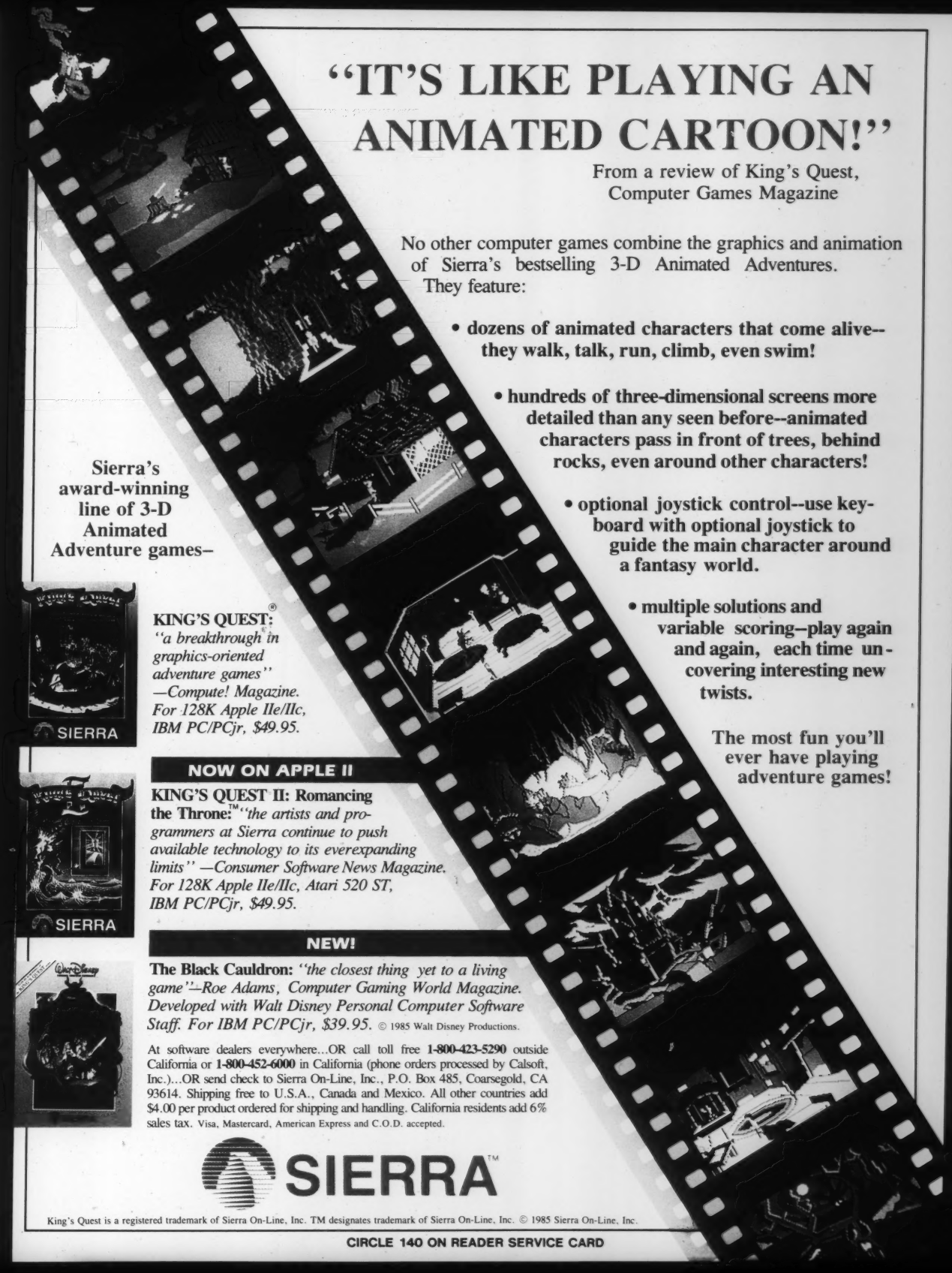
From a review of King's Quest,
Computer Games Magazine



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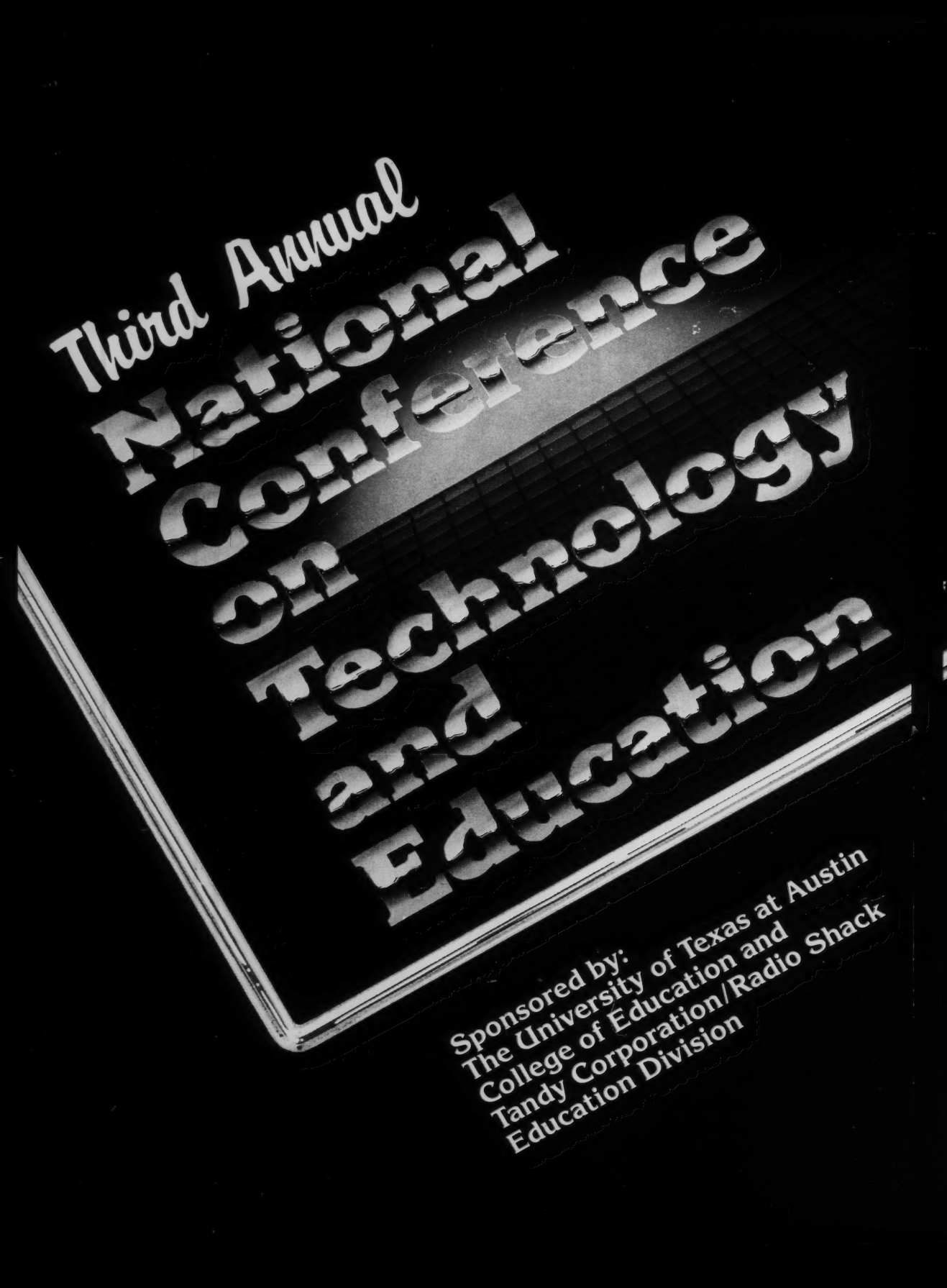
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Discover the impact of new technologies on the classroom. The third annual National Conference on Technology and Education will be held March 10-11, 1986, in Fort Worth, Texas. The two-day conference is co-sponsored by the University of Texas at Austin College of Education and Tandy Corporation/Radio Shack Education Division. The conference will again offer educational decision makers a forum to explore applications of computer technology, as well as the potential benefits and problems of computer usage in education.

Featured keynote speakers will include Admiral Bobby Inman, President and CEO, Microelectronic Computer Corporation; John G. Kemeny, Professor, Dartmouth College and Chairman of True BASIC, Inc.; Arthur Luehrmann, General Partner, Computer Literacy; Ann Kahn, President, National PTA; Richard Miller, Executive Director, American Association of School Administrators; and Thomas A. Shannon, Executive Director, National School Boards Association.

Breakout session speakers who will address timely topics include Dr. June Atkinson, North Carolina State Department of Education; Dr. Sylvia Charp, T.H.E. Journal; Leroy Finkel and Ann Lathrop, San Mateo Educational Resource Center; Dr. Mark Friedman, Carnegie-Mellon University; Dr. Victor Fuchs, LINC Corporation; Bill Gibbons, HOSTS, Inc.; Dr. Donald Holznagel, Northwest Labs; Dr. Ken Komoski, EPIE Institute; Dr. James Mecklenburger, National School Boards Association; Teresa Middleton, SRI International; Sandra Pratscher, Texas Education Agency; Dr. Gale Rose, New York University; Dr. John W. Rouse, University of Texas at Arlington; Dr. Herb Sang, Duval County, Florida, Schools; and Dr. John Verby and Dr. John Sandness, University of Minnesota Medical School.

Sessions will focus on educational courseware, classroom networking, hardware and software purchasing considerations, computer curriculum planning, administrative courseware and teacher training, robotics, artificial intelligence and more.

To those who request it, a Continuing Education Credit Unit of 2.0 hours will be granted by the University of Texas College of Education upon completion of the conference. Those who prove, may receive in-service wish, and whose districts approve, may receive in-service training credits for attendance. (An additional fee is required to receive CEUs.)

Plan to attend the National Conference on Technology and Education March 10-11, 1986. Registration fee is $95. Attendance is limited.

To receive more information and registration materials, mail this completed form to:

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CIRCLE 134 ON READER SERVICE CARD

INDUSTRY INSIDER

David H. Ahl

Can Jobs Do It Again?

The headlines read like a high-tech soap opera.

June 3, 1985: Apple Reduces Jobs' Duties in Overhaul Designed to Trim Costs, Bolster Stability

Aug. 2: Apple Chairman Jobs Is Selling Eighth of Stake in Computer Firm

Sept. 17: Apple's Jobs Plans New Computer Firm, Hires 5 From Concern He Co-Founded

Sep. 19: Apple Mulls Position After Jobs Quits

Sep. 20: Jobs' Team Building a Lisa-like Micro

Sep. 25: Jobs Asserts Apple Abandoned Efforts to Settle Dispute Over His New Venture.

Underlying the news stories is the notion that Steve Jobs is an American business hero on the order of Thomas Edison, John D. Rockefeller, and Lee Iacocca—an inventive genius, a master marketeer, a charismatic manager, and an astute financier—all rolled into one. Whatever he touches will turn to gold—Apple seems to think so (now that he has been forced out), and news reporters seem to think so, too (because it's nice to have Horatio Alger heroes).

Frankly, I think the jury—the market—is out and will be out for some time to come. But that doesn't stop us from looking back. And I do not see Jobs' name in lights. Let's look at the myth vs. the reality. Jobs the inventor: Steve Wozniak invented the Apple II, the longest-lived design in personal computers; Jobs had nothing to do with it. Jobs influenced

the design of the Lisa/Mac; "influenced" does not equal "designed."

Jobs the marketeer: The real management direction for Apple in its staggering growth period was provided by A.C. "Mike" Markkula and Mike Scott, not Jobs. Years later Jobs, recognizing that Apple needed leadership in marketing, brought in John Sculley.

Jobs the manager: "Morale hit a new low during the company's annual meeting when Macintosh division employees got front row seats to hear the zealous Mr. Jobs describe new Macintosh products. The Apple II division watched via closed-circuit television from a nearby auditorium."—*The Wall Street Journal*. Typical of Jobs.

Can Jobs' new Lisa for the education market make it? Sure! Colleges would love a cheap Vax or high capability Mac, but for Jobs' company to be a success a great many pieces will have to fall into place. Some of them will *because of* Jobs, but more will have to *in spite of* Jobs.

Symantec's Q&A Naturally?

Symantec's new file manager, *Q&A*, has two user interfaces—one like *pfs* and one like natural language. The natural language interface, called the Intelligent Assistant, lets the user ask complicated queries of the database in English sentences. Moreover, the user can expand on or modify an inquiry without having to start all over again.

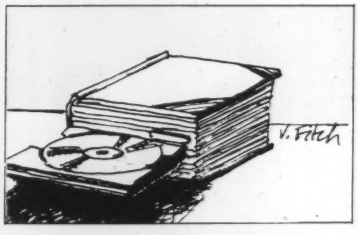
For example, for planning a trip one could ask, "Show me all the computer companies in Southern California." The program parses the sentence, highlighting each word as it grasps it, perhaps responding, "I do not understand Southern California." You could then "teach" it that Southern California means zip codes between 90000 and 93000. It would then ask, "Shall I create a report showing the companies?" You would say "Yes" and find that there are 73 companies—far too many to see on one trip. So you would then type, "Show me just those that have advertised in any magazine in the last three months and show me the ad pages." You might have to define a word or two and create a new column on the report for ad pages. The report now shows 19 companies—about right for a one-week trip.

Q&A appears to be an innovative and well-thought-out product. Its ability to use existing *pfs* files is a big plus. The company is composed of seasoned professionals, and although retailers are not exactly looking for more software to put on their shelves, *Q&A* ought to have a better than even chance of making it big.

Encyclopedia on CD-ROM

Grolier has put all nine million words of its *Academic American Encyclopedia* (21 volumes containing 30,000 articles) onto a single 4.72″ CD-ROM. The compact disk also contains a word-level index and search-and-retrieve software. Versions are available for the IBM PC and Atari 520ST at a price of $199 each.

The data in Grolier's encyclopedia are currently available on several on-line data services including CompuServe and Dialog. The on-line version is updated quarterly and thus is more current than the printed volumes.



The big advantage of the CD-ROM version is its word search software. This allows the user to enter a list of keywords and track down articles in which these words appear. When the full text of these articles is displayed, the keywords are highlighted. Even the most complicated searches require 30 seconds or less.

The text information, index, and programs occupy only about 20% of the usable capacity of the CD-ROM. In the future Grolier intends to include digitized illustrations along with a dictionary and thesaurus that are integrated with the encyclopedia on the other 80% of the disk.

Random Bits

As expected, **IBM** formally announced that it will merge the sales forces that sell to large and small customers. The reorganization will be along geographic lines; 12 regional sales offices will be eliminated. . . Cash-strapped retailers say that IBM's pre-Christmas rebates of 6-8% on XT and AT models are not sufficient to increase already bulging inventories. The wholesale price of the **PCjr** also has been reduced by another $174, which means that the street price should be in the $300-400 range—quite a bargain if the computer meets your needs. . .

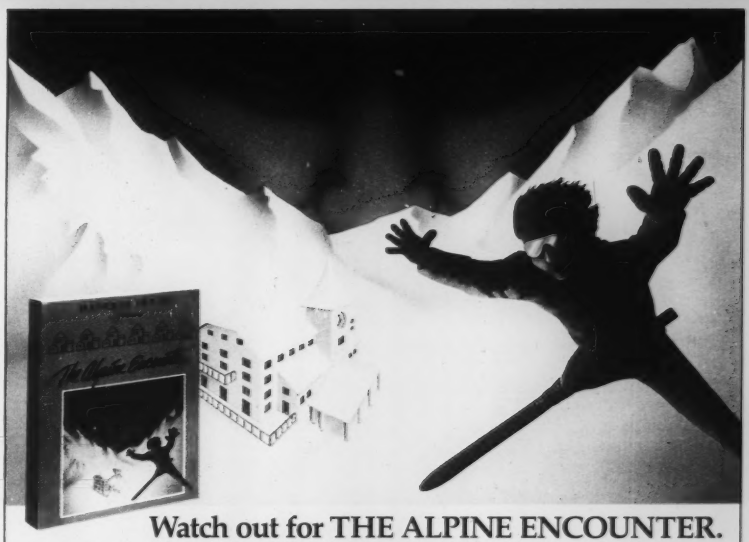
Distribution of the English-language version of the **IBM JX** (similar to the PCjr) is being expanded throughout the Far East. The machine is made by Matsushita (Panasonic) and sports a 3.5″ disk drive. No plans for the U.S. or Europe yet.

Checkmate Technology of Tempe, AZ has introduced a MultiRam CX card for the Apple II which contains a 16-bit 65C816 mpu and additional memory (up to 640K). A companion operating system, MAX-OS, from Micro Magic has multi-tasking and multi-user capabilities that allow creation of a Unix-like environment. The card with software costs $329. . . **Citizen** has introduced a 35 cps daisywheel printer with an 8K buffer that is compatible with the Diablo 630, NEC 3550, and Qume Sprint 11. The price is just $599.

Lotus admitted in September that *Symphony 1.1*, which began to ship in July, has a serious defect that can cause users to lose significant amounts of data. About 25,000 copies of version 1.1 have been delivered to customers. . . Having failed to win a significant market share with its QX line of computers, **Epson** has announced a me-too line of IBM PC compatible machines. . . **Sperry Corp.** has expanded its PC compatible line with a Mitsubishi-made Intel 80286-based machine to compete with the PC AT.

Commodore's fiscal 4th quarter loss of $124 million stunned analysts who believed Commodore just four weeks earlier when it said the loss would be around $80 million. . . **Mindset Computer Corp.**, maker of a machine that opened to rave reviews last fall, has filed for protection under Chapter 11. . . Rising from the dust is **Franklin Computer Corp.** with new financing and a new Apple-compatible computer, the Ace 2000. . . To help alleviate cash flow problems at **Morrow Computer, Zenith** has agreed to finance some of Morrow's inventory used in the manufacture of the Zenith Z-171 portable computer purchased from Morrow. . . **Ziff-Davis** announced that it has canceled plans to publish *Computer Industry Daily*, an on-line industry newsletter, and will disband the project.

Ever wonder what became of all those **ex-Atari** executives? Five of them, including former president Don Kingsborough, are selling high-tech animated story-telling toys. **Teddy Ruxpin** is a bear who blinks and moves his nose and mouth realistically as he tells stories or sings. He is controlled by computer chips, tiny motors, and a cassette player. Teddy's mates include Grubby, an octopod; Fobs, an insect (of sorts); and two others. ■



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CIRCLE 117 ON READER SERVICE CARD

RECREATIONAL COMPUTING

Finding the next number/Michael W. Ecker

Consider the number sequence 10 5 1 –3. What is the next number in the sequence?

This is the question asked by reader Joseph Kron of Stamford, CT, except that I changed the numbers somewhat. This is not a particularly easy question to answer, and in the spirit of "misery loves company," I must tell you right away that the question is not really well defined. It is precisely for that reason that many producers of standardized tests no longer ask such questions. In fact, were they to do so, to be fair, they would have to spell out what they meant. That, in turn, would defeat the purpose of the question, which we may presume to be some measurement of ability to discern a pattern. In short, the problem is that there is an infinite number of possible patterns.

What exactly does it mean to ask for a next number in a sequence (or, as others incorrectly say, in a series)? It means to find a pattern or a rule—maybe even a mathematical function or formula—that produces the given numbers and then to apply that rule to obtain the next number. An easy such example might be 2 4 6 8. For this, one clear pattern is doubling each natural number in sequence, or we could say that an explicit function is f(n) = 2 * n. Since that applies for n = 1, 2, 3, 4, we apply the result to n = 5 to obtain our next number (under this rule) of f(5) = 2 * 5 = 10.

Again, note that I spoke of *a* next number, not *the* next number. There are other sequences that begin in this fashion. As another example, there is a famed one that has to do with the maximum number of regions that can be formed inside a circle when n chords are drawn. If I am not mistaken, the results for n = 1, 2, and so on, begin 2, 4, 8, 16, . . . What's the next number? Well, it turns out to be 31, not 32!

All is not lost . . . Despite the disappointment of learning that the question itself is virtually meaningless, we can make sense of this if we are willing to define the rules of the game. This does render the subject a bit more mechanical, but at least you'll know what all the fuss was about on IQ tests and the like.

Let's take the example with which I began: 10, 5, 1, –3. One standard trick is to see whether there is a constant difference (as happens with our doubling sequence example, where the constant difference between consecutive terms is 2). The respective differences are: 5, 4, 4 (from 10–5 = 5, 5–1 = 4, and 1–(–3) = 1+3 = 4). Hmm . . . No good. But do we quit then? No, try again, this time using those last numbers. We get 1, 0. One more time produces 1. Picture this as:

```
10   5   1   –3
   5   4   4
     1   0
       1
```

Now we can extend this picture by working in reverse. Instead of working from the top down, we now addend another 1 to the bottom row and work from the bottom up. Instead of subtracting, of course, we must now add as we go up. This produces a new diagram:

```
10   5   1   –3   –8
   5   4   4   5
     1   0   –1
       1   1
```

If you check, you will see that the differences of terms in any row do indeed generate the row beneath it, although you do have to know how to subtract signed numbers. If you are desperate, you can stoop to using a calculator or a computer, but I hope you don't find that necessary.

Speaking of using a computer (you knew I was going to get to this, right?) we can write a program to generate a next number under the rule that an appropriate row of differnces is constant. In practice, this boils down to two possibilities. Either some row does have the same entry (as in the second array, where the bottom row has two ones), or else we get down to some solitary number (as in the first array, at which point we can extend that bottom row to get a row of the same entry, as we in fact did to produce the second array).

The program should allow you to specify the number of original terms, N (I'll use caps since most Basics do, even though we mathematicians usually don't). Use a doubly-subscripted array A(J,K). The entry A(J,K) should be in the j-th row and be the k-th entry in the row. If you examine the arrays we saw above, you note that the number of rows is N (the number of given terms), so 1 < = J < = N. The number of entries in any given row number J is a bit trickier, but it can be seen to be N–J+1. Hence, typical entry number K satisfies 1 < = K < = (N–J+1). These values will give the loop limits you'll need. Remember that we would like to test each row generated for having the same entries, since that is what we would do in practice. If such does not occur, we must generate the next row. Then we repeat, if necessary, until we hit either one that does or the bottom, single entry.

Next time I will show you my solution to this. For those of you who are newer to programming, you might get something out of this by working on a slightly easier problem. How about given A, B, C (i.e., always given three terms of the sequence, instead of an arbitrary number, N, of them), get a next term under the understanding discussed above? You would need to develop only D = A – B, E = B – C, compare D and E to determine whether to begin working up (yes if D = E), or to get F = D – E and then work up. You thus avoid arrays, but at least get something out of this. We all learn from handling simpler cases first.

As always, I actively solicit your comments, suggestions, improvements, solutions, new challenges, and so on. For instance, even though this month's topic is not brand new in the history of the world, its appearance here is directly attributable to reader input. Please confine your questions, however, to pertinent ones that relate to this column. If you would like a reply, please enclose a self-addressed, stamped envelope. Write directly to me: Dr. Michael W. Ecker, 129 Carol Dr., Clarks Summit, PA 18411.

Until next month, happy recreational computing! ■

What exactly does it mean to ask for a next number in a sequence?

Contributing Editor Michael W. Ecker is associate professor of mathematics and computer science at the Universtiy of Scranton in Scranton, PA. His first book is *Gems of Recreational Computing: The Joy and Beauty* (Arco Publishing, available late 1985).

Here's the inside story on all the colorful things that have happened at Apple.

Go ahead, accuse us of sensationalism.

Over the next four pages, we're going to bare our specs and divulge all the nitty gritty details about the latest developments to come out of Apple Computer.

Starting with our new Apple® ColorMonitor IIe and ColorMonitor IIc.

In all modesty, we think these are the best color monitors you can buy at any price for your Apple II, II+, IIe or IIc personal computer.

Both have composite color, 13-inch screens that let you produce a dazzling array of multi-hued graphics. Without going to the expense of adding an RGB interface card or external adaptor.

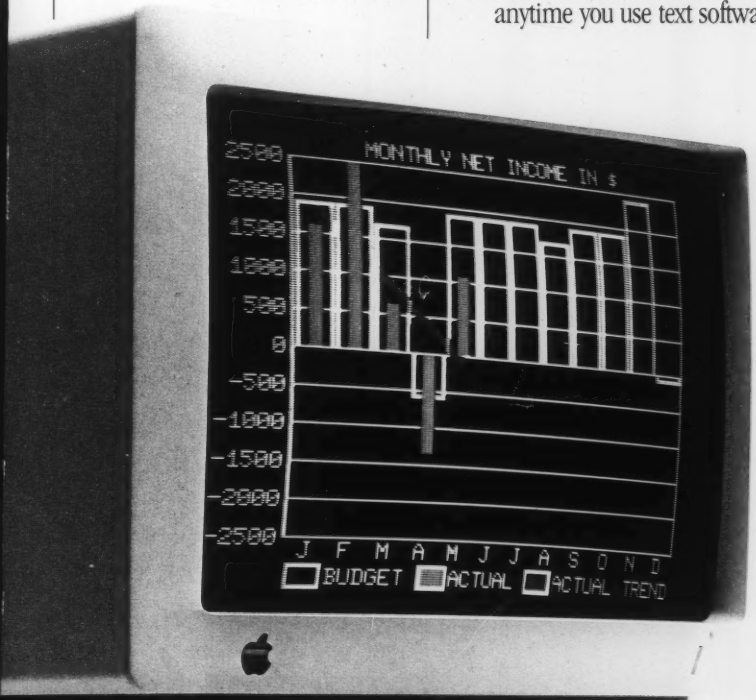
Simply plug the monitor directly into the video output jack on the back of your Apple, and you're ready to start computing in living color.

Which is terrific for games and graphics oriented programs like Apple Logo II, Instant Pascal™ and Dazzle Draw.

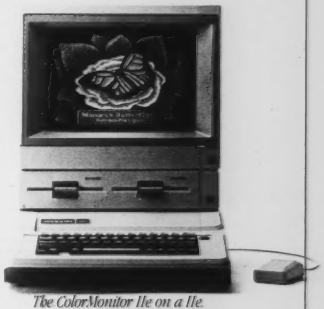
But not quite so terrific for text programs. As anyone who's ever gone blurry-eyed from trying to read words on a color CRT will readily attest.

Not to worry.

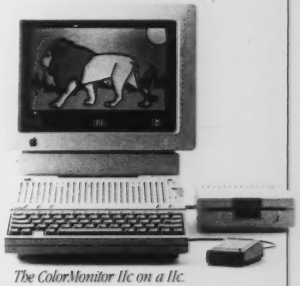
We've designed both ColorMonitors to automatically go from color to a high resolution, 80-column monochromatic mode anytime you use text software.



As you can see, we've also styled each ColorMonitor to fit in with our family looks. The ColorMonitor IIc is pure white, and has an optional rigid stand. While the ColorMonitor IIe is designed to rest on top of your Apple IIe, and comes in our favorite shade of beige.



The ColorMonitor IIe on a IIe.



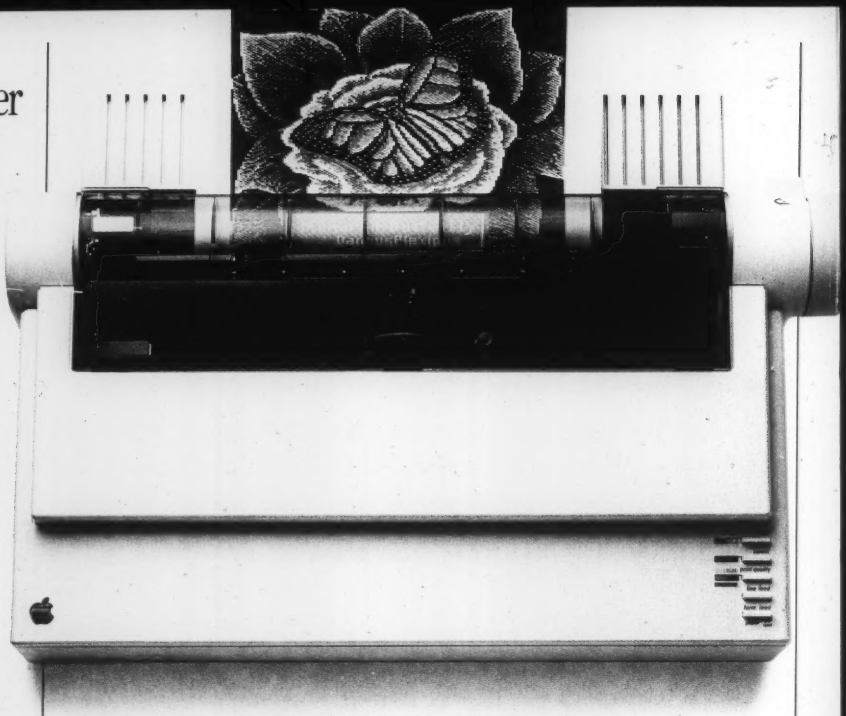
The ColorMonitor IIc on a IIc.

And thanks to some particularly bright Apple engineers, our ColorMonitors are compatible with virtually all existing Apple II software.

Well, there you have it. The scoop on one of the most colorful events in Apple history. But as you might expect, it's certainly not the whole story.

If you turn the page, you'll see that the saga continues.

The truth about our new color printer in black and white.



In case you haven't heard, Apple has a whole new cast of characters.

Our ImageWriter™ II printer.

Like its predecessor, the original Apple ImageWriter, our ImageWriter II is one of the most dependable dot matrix printers very little money can buy. And it's compatible with every Apple personal computer.

But that's where the similarities end.

The ImageWriter II prints faster and clearer than the original ImageWriter.

It cruises through drafts at a blazing 250 characters per second. Produces sharp graphics. Creates near letter-quality text. And lets you print in six vivid colors.

ImageWriter II 32K Memory Option.

Simply change the black ribbon to the continuous cloth, multi-color ribbon, and you're ready to churn out reams of yellow, red, blue, orange, green and purple output.

You can print pictures and greeting cards with software like Stickybear Printer. Design your own color drawings with Blazing Paddles and Dazzle Draw. And whip out color business graphics using SuperCalc 3A, pfs: GRAPH or Mouse Calc.

As you would expect, you can vary the pitch and spacing on the ImageWriter II. And print in standard or half height.

But as you would probably never expect, the ImageWriter II is also expandable.

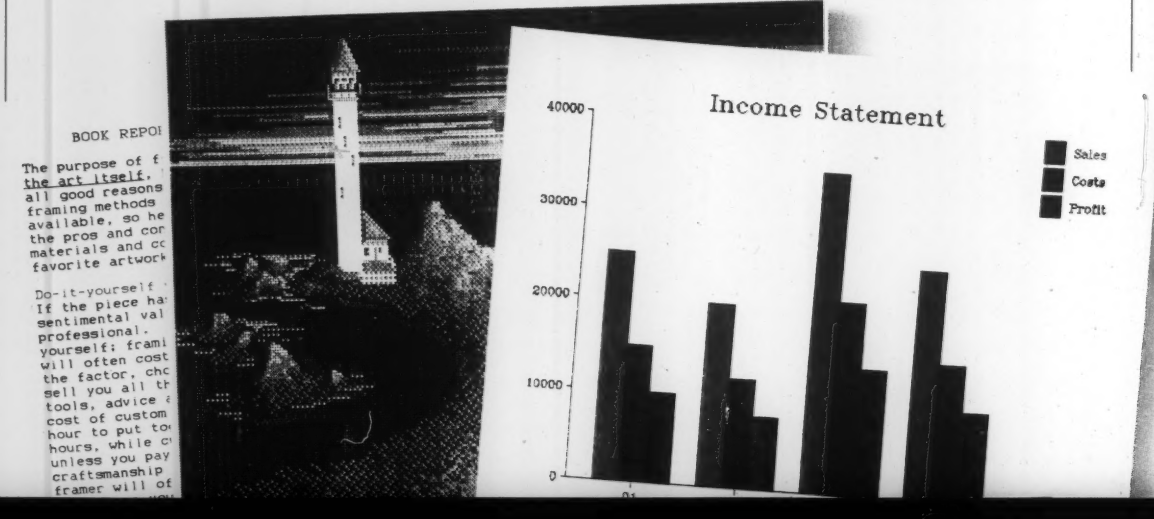
By adding the ImageWriter II 32K Memory Option print buffer, you can continue to compute while the printer continues to print.

Attach the ImageWriter II SheetFeeder, and you can automatically load single sheets of paper into the printer.

And by having your authorized Apple dealer install our AppleTalk™ Option, the ImageWriter II can even be shared by several different Macintosh™ workstations.

Which means, for businesses, it can vastly improve the looks of one very important piece of paper:

Your budget sheet.



Snow white and dwarf monthly payments.

Once upon a time, most people had to dwindle their checking accounts down to the right side of the decimal point in order to buy an Apple.

Or stretch their charge cards to the place where they didn't have a choice but to leave home without them.

Then, mercifully, our finance department invented the Apple® Credit Card.

Apple Computer, Inc.

With an Apple Credit Card, you may qualify for up to $2,500 of instant credit to spend on the Apple computer or peripherals of your choice.

And, from now until December 31st, 1985, we'll generously waive the 10% down payment.

Which means the only thing you'll have to come up with are the small monthly payments.

Getting your Apple Credit Card is almost as easy as breathing. All you need is another major credit card. And a valid I.D.*

Which means, that very same day, you'll be able to take your new Apple home.

Where you'll both live happily ever after.

Group therapy for Apple users.

Have you ever felt like you needed help—serious help—with your Apple, but didn't know where to turn?

Then we suggest you join an Apple Users Group.

From Kennebunkport to Kaanapali, Apple Users Groups are springing up by the dozen.

They meet to discuss ProDOS,™ Pascal and WPL. Exchange public domain software. Demonstrate new products. Listen to guest speakers.

And provide the kind of moral support that comes in handy after "Range error" has popped up on your DOS 3.3 screen for the 42nd consecutive time.

Many groups publish regular newsletters and magazines. And operate bulletin boards that let you get the information you want from the comfort of your own modem.

But the most important thing to know about Apple Users Groups, is that they're not just for hackers. In fact, most members have only novice or intermediate computing skills. Which is why they join in the first place.

To get in touch with the Apple Users Group in your area, check with your local authorized Apple dealer.

With over 400 Apple Users Groups already in existence throughout the U.S. and Canada, chances are the help you need is right around the corner.

Your computer should join a health club.

Computers—even Apples—can sometimes be temperamental little devils.

And if something goes wrong with yours after the 90-day limited warranty expires, you're the one who'll be out of shape.

Unless you get Apple*Care*.℠

Apple*Care* is our extended service contract that covers the cost of parts and labor for up to three years. And the annual fee is usually about half the cost of a single repair.

You can buy Apple*Care* from your participating authorized Apple dealer. And the contract will be honored at more than 2,400 Apple dealers across the country.

So even if you decide to move to some out-of-the-way place like Keokuk, your Apple*Care* coverage will go along with you.

Although we can't guarantee your family will.

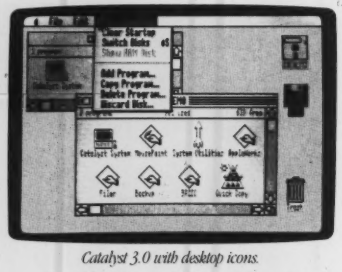
By major, we mean MasterCard, VISA, American Express, Diner's Club and Carte Blanche. Certain restrictions may apply. *© 1985 Apple Computer, Inc. Apple and the Apple logo are registered trademarks of Apple Computer, Inc. ProDOS, DuoDisk, UniDisk, ImageWriter and AppleTalk are trademarks of Apple Computer, Inc. AppleCare is a service mark of Apple Computer, Inc. Macintosh is a trademark of McIntosh Laboratory, Inc. and is being used with its express permission. Catalyst is a trademark of Quarle Incorporated. Instant Pascal is a trademark of Think Technologies. Dazzle Draw is a trademark of Broderbund, Inc. Stickybear is a trademark of Optimum Resource, Inc. Blazing Paddles is a registered trademark of Baudville, Inc. SuperCalc is a trademark of Sorcim Corporation. PFS is a registered trademark of Software Publishing Corporation. Mouse Calc is a trademark of Version Soft. Hayes is a registered trademark of Hayes Microcomputer Products, Inc.* *For an authorized Apple dealer near you, call* ***(800) 538-9696.*** *In Canada, call* ***(800) 268-7796*** *or* ***(800) 268-7637.***

Stop flipping between floppies.

We call it the "floppy disk shuffle."

Having to boot and re-boot floppy disks every time you want to go from one application to another.

Well, the end of your shuffling is in sight.



Catalyst 3.0 with desktop icons.

Quark, Inc., will soon be shipping a unique new program called Catalyst™ 3.0 that's designed to be used with Apple II computers equipped with mass storage.

Catalyst 3.0 lets you install multiple programs on a single storage device. Macintosh-type desktop icons show you what's loaded on the program. To select the item you want, simply use an optional mouse or keyboard to open the file.

Look for Catalyst 3.0 to show up on dealer shelves soon.

Then you'll finally be able to boot all those floppies for good.

A plug for our new modem.

With the introduction of our new Apple Personal Modem, we've solved one of the biggest problems known to modems:

Where to hide them.

The Apple Personal Modem plugs directly into a standard A/C wall outlet. So unless your computer room is decorated with paisley wallpaper, it'll blend right into the immediate surroundings.

Of course, aesthetics aside, it's also one darn good modem.

The Apple Personal Modem offers 300/1200 baud operation. Has the latest VLSI technology. Features automatic dial, re-dial and answer capabilities. Uses the industry standard Hayes AT Command Set. Plus it's totally compatible with current Apple communications software.

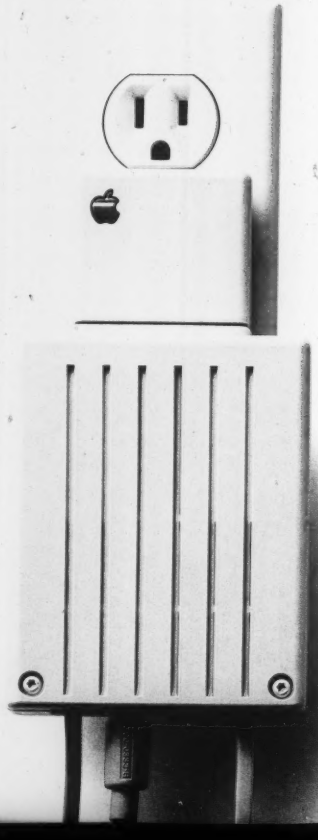
And even though we designed the Apple Personal Modem to be out of sight, there's one part of it that's definitely not:

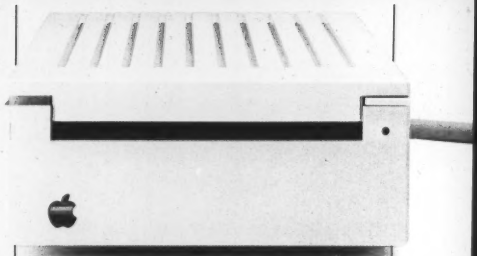
The price.

We've increased our drive.

Our capacity for work just got bigger.

The new Apple UniDisk™ 3.5 external drive uses 3½″ dual-sided microdisks to add a humongous 800 kilobyte capacity to your Apple II, II+, IIe or IIc. Which is more than five times the amount of storage available from a standard 5¼″ drive.





The UniDisk 3.5 is also faster than 5¼″ drives. So you'll spend less time listening to that all-too-familiar whirring sound.

You can even "daisy chain" a second UniDisk 3.5 off the first one. In case you're planning to write the next great American epic or something.

As you may not know, disk drives are the most vulnerable components of any computer system. So it's nice to know that no other disk drive is closer to fail-safe than our UniDisk 3.5.

Because no other company has our dedication to quality. Our concern for reliability.

Or our drive.

Coming Soon: The biggest Apple IIe in memory.

The Apple II Memory Expansion Card should be on dealer shelves soon.

Before long, you'll be able to instantly and easily add another 256K, 512K, 768K or full megabyte of RAM to your Apple II, II+ or IIe. Making it one of the most powerful personal computers in its class. Or business. Or home.

TRY THIS!

The year of the locust: How do the 17-year cicadas know?/**Edward H. Carlson**

It's Iowa in the early summer of 1980. From high in the trees, the strident song of the 17-year locusts shatters the air. That the locusts (really cicadas) emerge in observable numbers only every seventeenth year is an enigma. How does the nymph (a sort of grub), burrowing through the dark ground and feeding on roots, know when all the other nymphs are ready to emerge as adults and so synchronize her actions to join the huge throng mating and laying eggs? An answer arises from three common principles of ecology, but does not jell into understanding until you model the ecological system on your computer.

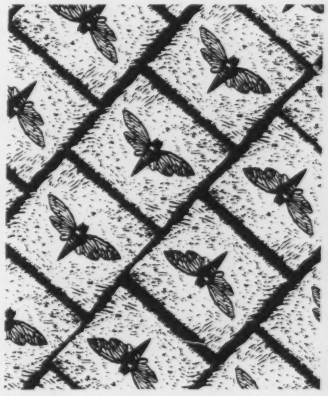
First the 17 years. The number is prime and large and so carries a cargo of mystery. But we set this fact aside, because an individual nymph has a built in calendar to keep track of the years. It is not the 17 years that puzzles us, it is the synchronization. Why don't a few nymphs accidentally get off cycle by a year or so and start a new group that comes out in a different year? Why doesn't this happen repeatedly so that eventually the same sized swarm emerges each year? In fact, a few nymphs always do miss the proper year, but they have never been able to establish a competing "year of the locust."

Well then, if the internal clocks of the cicadas are not responsible for keeping them synchronized, perhaps nature has an external clock of some kind. Let's see . . . maybe sunspots? No, that is a 22-year old cycle. It is a puzzlement!

The external clock idea drifts away in a wisp of smoke when we find there are cicada species having a 13-year life span that also show synchronized emergence (every 13 years, of course), and species with life spans shorter than 10 years that do not. Moveover, in different parts of the country the "seventeenth" year is not the same. The brood in Michigan had a seventeenth year in 1970, not 1980. Other provinces in North America have still different emergence years.

Perhaps the Michigan cicadas are a different species from those in Iowa? Surprisingly, not so! In Iowa, all three of the "17-year" species come out in the same year, even though they cannot mate with each other and may even be competing for the same food supply. Likewise, the same three species co-exist in Michigan, but their seventeenth year is, as we noted, not the same as that of the Iowa beasties.

Illustration by Virginia Fitch



That the cicadas emerge in observable numbers every seventeenth year is an enigma.

So it doesn't depend on species, nor on external clocks, and is a local effect (because different parts of the country can be out of sync with each other). And we have the curious fact that the different species in the same locality pick the same year—as if there were safety in numbers! Hey, maybe that's the key. There *is* safety in numbers. Predation becomes saturated: the birds have stuffed tummies and can eat no more when all the cicadas emerge in the same year.

Let's organize our ideas, going back to fundamentals of ecology that date from Malthus. First principle: A small cicada population which does not experience any predation or other loss of lives will grow exponentially, because each female adult lays a thousand or more eggs. Second principle: The food supply is finite, so the population cannot continue to grow exponentially but must level off below some maximum value.

To all this we now add our third idea, nonlinear predation. Birds munch cicadas with gusto, and in fact can normally drive the population nearly to zero. But if too many adult cicadas emerge at once, the bird population can catch only a small portion of them. There is safety in numbers for the cicadas. But more. It is a fat year for the overfed birds, and they will raise a bumper crop of fledglings and return the next year in such large numbers that the "safety" for cicadas diminishes or evaporates. An extra large cicada population one year suppresses the cicadas for the next few years.

The Program

With these ideas in place, it is time to turn on our computers. The program in Listing 1 models a cicada-bird ecological system. The subroutine at line 400 takes the system through the seasons of a year. The subroutine at line 200 prints the results, and then the program goes on to the following year—looping repeatedly until you hit the Ctrl-Break keys.

In the spring, the birds return from their winter vacation (somewhat reduced in numbers from the fall—line 409). The oldest brood of nymphs emerge as adults, and all other broods move up one year (loop at line 415). There is a year to year loss in brood size, which is greater for large broods, (the IF G>GM THEN G=G*SS statement) modeling a finite food source. Although this extra attrition of about 10% (giving around 60% survival of a brood over a year instead of 65%) seems to be small, the fact that it hits an extra large brood year after year until the brood size falls below the threshold gives it great power to limit the final adult population.

Starting in the summer season, the serious eating gets underway. If the number of cicadas is not too large, the birds eat mostly other food. If many cicada adults emerge, the birds specialize in hunting them down. Finally, line 426 contains the "full tummy" idea—that a given flock of birds can eat just so many cicadas.

The fall is account settling time. We total up how many cicadas survive to lay eggs and also look at the fledging-to-adult count among the birds. The more cicadas eaten, the more birds and the fewer cicada eggs.

The program starts off with a uniform brood size in the ground for each emergence year. After running for about 100 years, every seventeenth year will show huge populations, the rest very small. A similar action occurs when you pick a 13-year life cycle (make P=13 in line 2130).

Now for the fun. Play around with the program, trying different sized parameters. Keep your changes small at first (about 10% is fine) because the system is very sensitive to certain of them.

Also feel free to alter the formulas by which I calculated the various quantities.

You must always set the initial conditions, such as the original number of birds and brood size, to "shock" the oscillating system, to get it going properly (like giving a push on a swing). This does not violate the purpose of the simulation, which is to show that once set properly on its way, the system settles down into synchronized emergence. After all, the original push given in nature to the cicada-predator system happened long ago—probably under different conditions from those presently in effect—so the system parameters at the beginning of a run have little meaning anyway.

Program Changes

After you become familiar with the machinery of this simulation, try this worthwhile project: The present program automatically develops a synchronized emergence pattern for cicadas with life cycles of longer than 12 years. It would be nice for it to develop modest sized populations that are the same from year to year for those cicadas with life cycles shorter than 10 years, because this is what is observed in nature. We want this to come about with no other change in the program except making P = 10 in line 2130. Listing 1 does not measure up to this additional requirement. See if you can fix things up!

If you succeed in the above task, seek this golden nugget: Try having several species (maybe six) of cicadas, each with a different life cycle length—say from 12 to 18 years. Let the life cycles occasionally shift in length by a year, at random. Run this simulation under non-linear predation for a long time and see if eventually the system settles down into one with only the 13- and 17-year cycles surviving

Listing 1. Seventeen year locusts.

```
1 GOTO 2000: ============== SEVENTEEN YEAR LOCUSTS ============================
2 REM file name:CICADA          disk name:CC                      E. H. Carlson
100 REM ------------------------- MAIN LOOP ------------------------------------
120 GOSUB 400                              :REM go through seasons of one year
140 GOSUB 200:GOTO 120                     :REM display populations for the year
199 END
200 REM -------------------- DISPLAY POPULATIONS ------------------------------
210 LOCATE 1,1,0   :PRINT" year  grubs by year of emergence"
220 FOR I=1 TO P                           :REM print year, grub population
221 LOCATE I+2,1   :PRINT TAB(20)          :REM erase old numbers
223 LOCATE I+2,1   :PRINT Y+P-I;TAB(7);G(I);:NEXT I
227 LOCATE  3,21   :PRINT   "Cicada eggs laid"
231 LOCATE  6,40   :PRINT   "In Year";Y
234 LOCATE  8,20   :PRINT A;"cicadas emerge  ";TAB(50);BA;"birds arrive  "
235 EB=INT(EB+.5)                          :REM round off
236 LOCATE  9,20   :PRINT E;"cicadas eaten   ";TAB(50);EB;
237 :              :PRINT   "caught per adult bird  "
238 LOCATE 10,20   :PRINT TAB(50);BB;   "baby birds survive   "
239 LOCATE 11,20   :PRINT INT(AS*100/A);"% cicadas surviving  "
250 GS= SR    ^P*NE                        :REM for debugging
251 GL=(SR*SS)^P*NE                        :REM GS=small gain, GL=large gain
254 LOCATE 13,20   :PRINT " Gains in Cicada loop"
256 LOCATE 14,20   :PRINT " open,   small signal";GS
260 LOCATE 15,20   :PRINT " closed, small signal";GS*AS/A;"          "
266 LOCATE 16,20   :PRINT " open,   large signal";GL
270 LOCATE 17,20   :PRINT " closed, large signal";GL*AS/A;"          "
290 Y$=INKEY$                    :IF Y$<>" " THEN 299:REM return
291 LOCATE 23, 2   :PRINT "Pause"
292 Y$=INKEY$                    :IF Y$<>" " THEN 292
293 LOCATE 23, 2   :PRINT "     "
299 RETURN
400 REM ----------------- YEAR GOES THROUGH SEASONS ---------------------------
406 REM ------------------------- spring -------------------------------------
408 Y     =Y+1                             :REM increment year
409 BA    =INT(B*.85)                      :REM birds arrive from south
410 A     =INT(G(P)*SR)                    :REM locust adults emerge from ground
415 FOR I =P TO 1 STEP -1                  :REM update array of grubs in ground
416 G     =G(I)*SR:IF G>GM THEN G=G*SS     :REM grub loss during year
417 G(I+1)=INT(G):NEXT I                   :REM move years' brood along array
420 REM -------------------------- summer ------------------------------------
422 FP    =A/BA                            :REM adult cicadas per bird
423 :             EB=.9 *FP                :REM birds concentrate on cicadas
424 IF FP<FC*2 THEN EB=.7 *FP              :REM fewer cicadas
425 IF FP<FC/2 THEN EB=.5 *FP              :REM few cicadas, half eaten
426 IF EB>400  THEN EB=400                 :REM birds tummies full?
430 E     =INT(EB*BA)                      :REM total cicadas eaten by birds
435 AS    =A-E:IF A=0 THEN A=1             :REM # of adult cicadas who survive
440 REM ---------------------------- fall -----------------------------------
450 F     =(100*FC)                        :REM basic food supply for birds
452 F     =F+E                             :REM add on cicadas as bird food
454 FA    =.7*F                            :REM food eaten by adult birds
455 IF F>AF*BA THEN FA=100*BA              :REM adults have enough food?
456 FB    =F-FA                            :REM food for babies after parents eat
458 BB    =INT(FB/BF)                      :REM turn food into baby birds
460 IF BB>2.5*BA THEN BB=INT(2.5*BA)       :REM limit to size of fledgling class
462 B     =INT((FA/100)*.85+BB)            :REM new bird population
480 G(1)  =INT(AS*NE)                      :REM cicadas lay eggs
499 RETURN
1000 REM ====================== DESCRIPTION ================================
1010 REM
1020 DATA "                    The Year of the Locust                       "
1025 DATA ""
1030 DATA "A simulation of the synchronized emergence of seventeen year"
1035 DATA "locusts (cicadas).
1099 REM
1100 REM ------------------- global variables ------------------------------
1110 REM Y, P  year date, life cycle length of cicada in years
1115 REM A     adult cicadas
1119 REM B     birds surviving until spring
1120 REM BA    adult birds arriving in spring from the south
1125 REM BB    birds born this year
1140 REM E     total number of cicadas eaten
1145 REM AS    total number of cicadas surviving
1146 REM EB    cicadas eaten per bird
1150 REM F     total food eaten by birds in cicada equivalents
1152 REM FA,FB food eaten by adult birds, baby birds
1153 REM FC    constant background food available to birds
1154 REM FP    adult cicadas/adult bird ratio
1155 REM G,G() number of grubs in the ground by year of emergance
1160 REM GM    maximum number of grubs before turning on extra attrition
1161 REM NE    number of eggs laid per adult cicada
```

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CIRCLE 114 ON READER SERVICE CARD

and several species piled up in each. (Note that 13 and 17 are the only prime numbers in the range.)

The ideas behind this simulation came from a chapter called "Mathematical Aspects of Population" by Prof. Frank C. Hoppensteadt in *Mathematics Today*, Vintage Books, New York, 1980. I am sure that Listing 1 is very crude compared with his work. In a conversation with Prof. Tom Moore, biologist at the University of Michigan, I have learned that the cicada synchronization problem is much more complex than this little program leads you to suppose. Listing 1 shows that non-linear predation is one possible mechanism for effecting synchronization, not that it is necessarily the correct explanation. ■

Listing 1. *(continued)*

```
1162 REM SR,SS survival rate/year of grubs, extra attrition of grubs
1163 REM GS,GL gains in cicada loop, small and large number of grubs
1165 REM I, Y$ index in a loop, input character
2000 REM ==================== INITIALIZATION ================================
2110 DIM G(17)                          :REM array of grubs in ground by year
2115 G    =200000!:G(1)=G               :REM original brood size
2116 B    =50                           :REM original number of birds
2120 GM   =7E+07                        :REM grub max. before extra attrition
2122 FOR I=1 TO 16:G(I+1)=G:NEXT I      :REM load pipeline with grubs
2125 A    =INT(G(17)*.8)                :REM original number of adult cicadas
2127 NE   =2000                         :REM number of eggs / cicada
2128 FC   =100                          :REM background food/ bird
2129 AF   =100:    BF=200               :REM food needed per adult, baby
2130 Y    =1967:   P = 17               :REM start year, cycle length
2138 SR   =EXP((LOG(1.4)-LOG(NE))/P)    :REM survival rate for grubs
2140 IF SR>1 THEN SR=1                  :REM no more than 100% survival
2141 REM SR should be around .65 at P=17; .57 at P=13
2142 SS   =EXP(-LOG(SR)-(LOG(NE)-LOG(.5))/P):REM lower rate for large pop.s
2143 REM SS large enough to hold large signal gain below 1; SS=.9
2190 REM PRINT SR,SS:stop               :REM use during debugging
2700 REM ---------------------- explanation ---------------------------------
2710 CLS:PRINT:PRINT:PRINT              :REM clear screen
2715 FOR I=1 TO 4
2720 READ Y$:PRINT TAB(5) Y$:NEXT I     :REM write explanation on screen
2722 PRINT:PRINT
2730 PRINT "    During the simulation, press space bar once to pause, and"
2732 PRINT "    again to resume the run."
2788 LOCATE 20,1
2790 PRINT "    Press the space bar to continue."
2791 IF INKEY$<>" " THEN 2791
2999 CLS:GOTO 100                       :REM clear screen and go to main loop
8000 REM Written in BASICA on an IBM PC with an 80 col. green screen monitor.
8002 REM For some other computers, use GET for INKEY$; and HTAB, VTAB for
8004 REM LOCATE.  These are not exact replacements, see your manuals.
9999 REM .========.=========.=========:=========.=========.=========.==========
```


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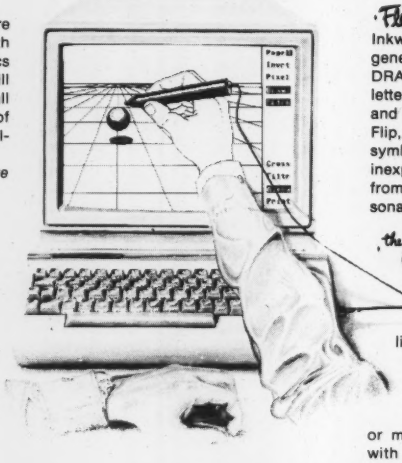

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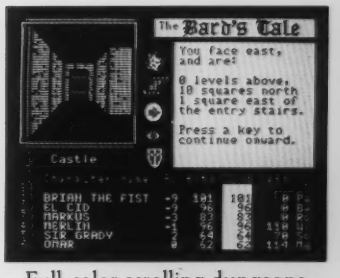

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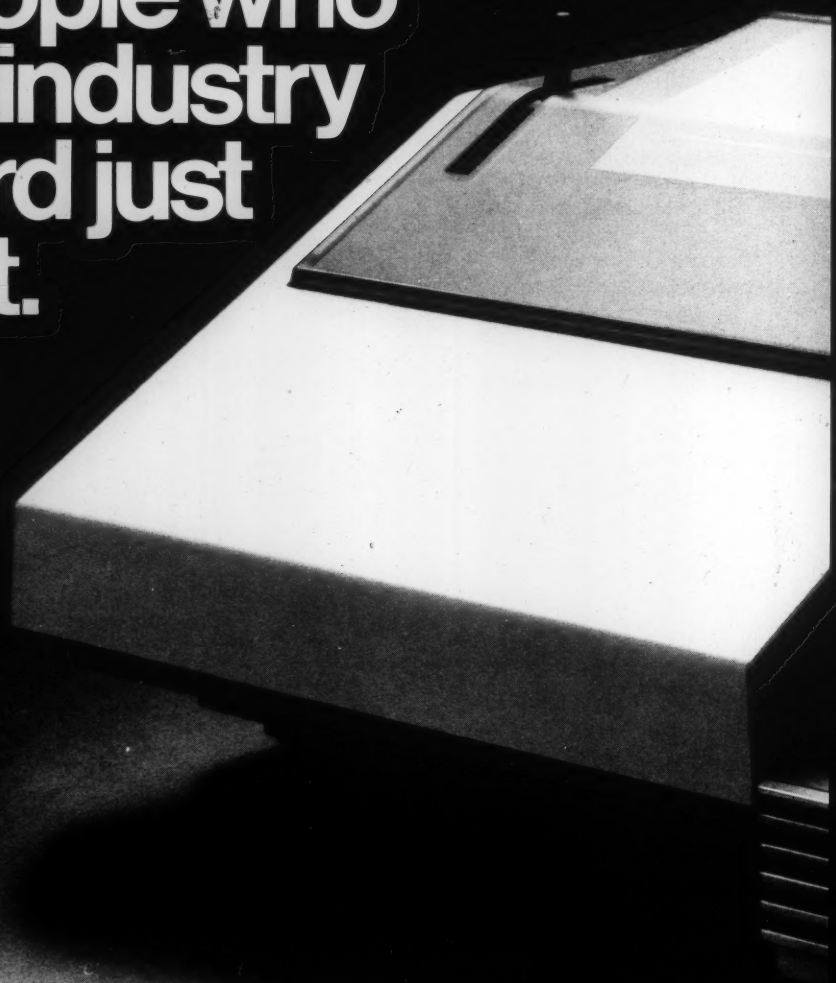

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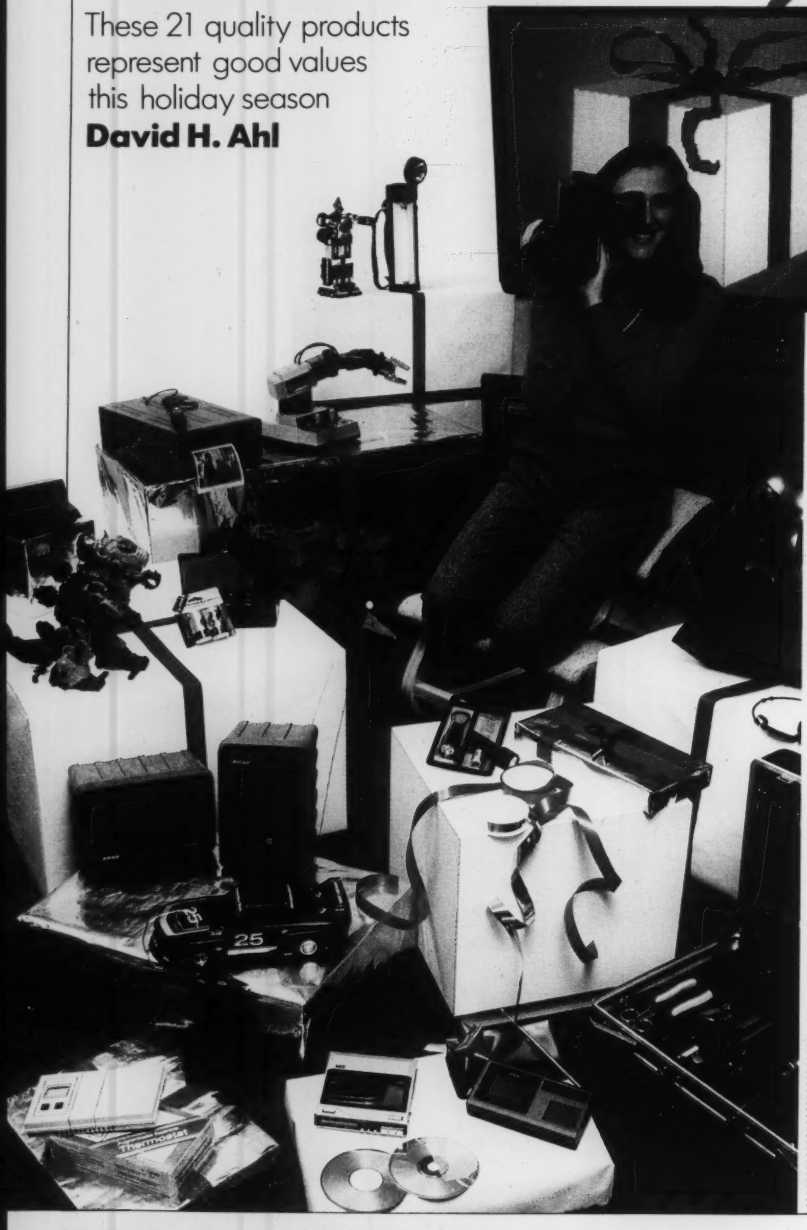
Wrap Up A High-Tech Holiday

These 21 quality products represent good values this holiday season

David H. Ahl



If your mailbox is anything like ours, it has been filling up lately with catalogs from scores of companies selling a wide range of neat looking stuff. Unfortunately, the descriptions of many of the products are far better than they are in the flesh. For example, have you ever tried to clean your keyboard with one of those mini vacuums? If so, you know that they are practically worthless. Or how about the keychains that let out a whistle when you clap your hands so that you can locate your lost keys? Clearly an idea whose time has not yet come.

We went shopping—both in catalogs and in stores—and bought 50 or so high tech products. Many of them fell far short of our expectations; some we returned and some are now gathering dust. But here are 21 products that do live up to their claims, represent a good value, and are worthwhile, fun, or both. Happy Holidays!

Projection Television

Get in the middle of the action—be it a 49er's game, computer flight simulator, or favorite flick. Hitachi's projection TV uses a curved lenticular screen which provides excellent clarity and pure colors over a wide 90° field of view. It has a spectacular four-foot picture with over 5.6 times the viewing area of a 19″ set, yet it folds up and doesn't dominate the room when not in use. Discount price about $2500.

All photography by Jeff MacWright (except as noted)

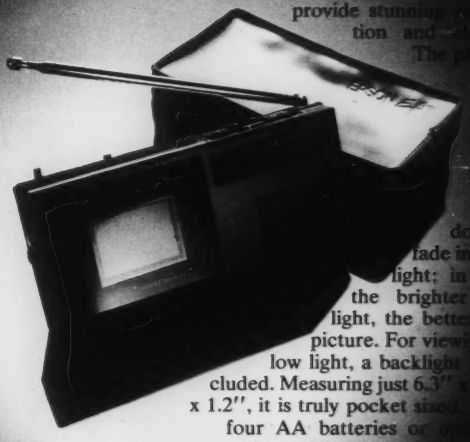
Personal Copier

Tired of bringing documents to be copied to a library or downtown copy center—or sneaking copies at work? At just 17″ x 17″, the Xerox 1020 Marathon copier is compact enough to fit almost anywhere—yet it has many big copier features. It copies onto any type of plain paper, has five contrast settings, handles paper up to 14″ long, and has advanced microprocessor diagnostics which are displayed on an easy-to-use control panel. $1495.

Photograph courtesy of Xerox Corp.

ocket olor TV

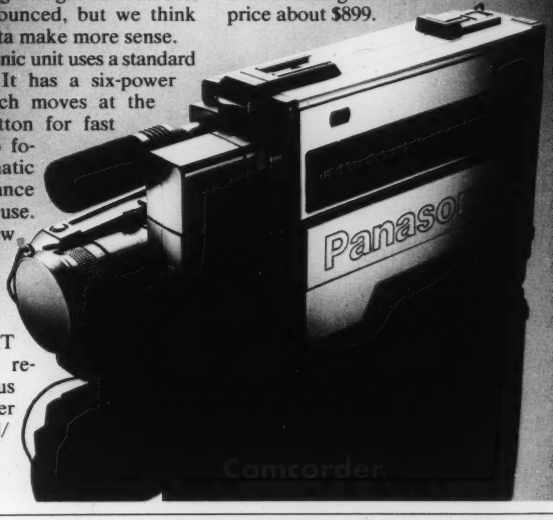
For watching baseball [illegible] the news at noon, or MTV [illegible] streets, Epson's ELF ET-12 [illegible] is perfect. The 2″ flat screen [illegible] of 52,800 thin film transistors [illegible] provide stunning [illegible] tion and [illegible] The [illegible] does [illegible] fade in [illegible] light; in [illegible] the brighter [illegible] light, the better [illegible] picture. For viewing [illegible] low light, a backlight [illegible] cluded. Measuring just 6.3″ [illegible] x 1.2″, it is truly pocket sized [illegible] four AA batteries or [illegible] rechargeable battery [illegible]



So you have a VCR and want to [illegible] your own movies. It's easy and [illegible] We think a camcorder is a better [illegible] than a video camera because you [illegible] have to lug around a bulky [illegible] VCR. Of the several VHS [illegible] models, we like the Panasonic the best. [illegible] Beta format, Sony makes Beta-[illegible] movie. Several lightweight 8mm models [illegible] been announced, but we think [illegible] VHS or Beta make more sense.

The Panasonic unit uses a standard VHS cassette. It has a six-power zoom lens which moves at the touch of a button for fast close-ups. Auto focus and automatic white balance make it easy to use. A record/review function lets you play back the last few seconds of recording on the CRT viewfinder to review previous frames. Recorder also has forward/reverse search, freeze frame, and pause. With rechargeable NiCd batteries, it weighs a hefty 7.5 pounds. Discount price about $1200.

The 6.8-pound Sony Betamovie has similar features to the Panasonic but uses a full-length Beta cassette. Its optical viewfinder is less convenient than a CRT one, but the picture quality is outstanding. Discount price about $899.



Dynaman

Bandai's Dynaman is 10″ tall, carries a large sword and shield, and is ready for action and fun. Made of durable die cast metal and high impact plastic, it unlocks into three separate vehicles: Dynamach, a tiny speedy plane; Dynamobile, a tough mobile machine; and Dynagarry, the space age carrier platform that transports the other two vehicles. One of the sturdiest and most attractive of the many changeable robots on the market, Dynaman is as intriguing to adults as it is to kids. $39.

Back Chair

A back chair is designed to keep your spine in a neutral position while placing most of your body weight on your legs. Proponents say it fosters better posture and deeper breathing, reduces fatigue, and lowers the risk of lower back trouble. We tried some of the many varieties of back chairs and concluded that a design with wheels or a rocker is better than a stationary one. Also, a woven fabric, preferably cotton, is much better than a synthetic fabric with a nap. Synthetic fabrics, generally found in the cheaper models from Taiwan (simply called "The Back Chair"), cause static discharges that can wreak havoc with your computer. $80 to $250.

Rechargeable Battery Kit

With practically everything running on batteries these days, buying replacement batteries can get mighty costly. In our test of batteries three years ago we concluded that rechargeable NiCad (nickel cadmium) batteries were the most economical in the long run. They are an even better buy today as the prices of rechargeable battery kits have come down. Moreover, the leakproof construction of NiCad batteries means that they can't damage flashlights or electronic devices, even if they are left in for years. Chargers cost $10 to $20; batteries about $3 to $5 each.

Programmable Electronic Thermostat

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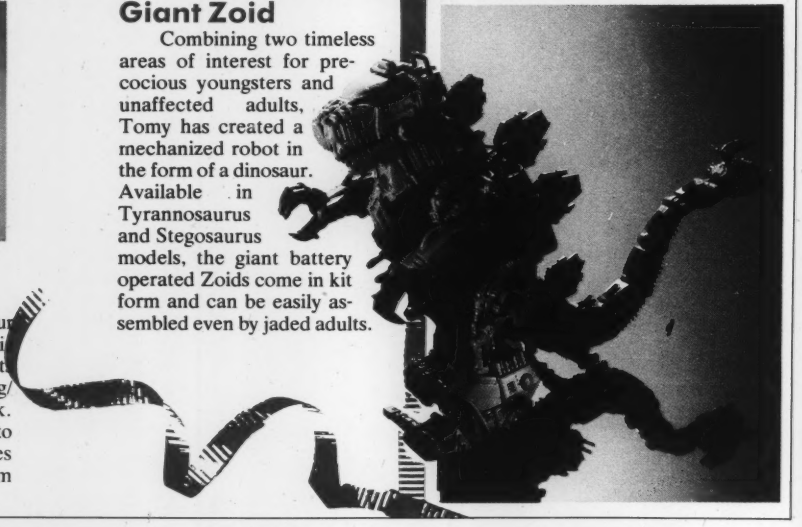
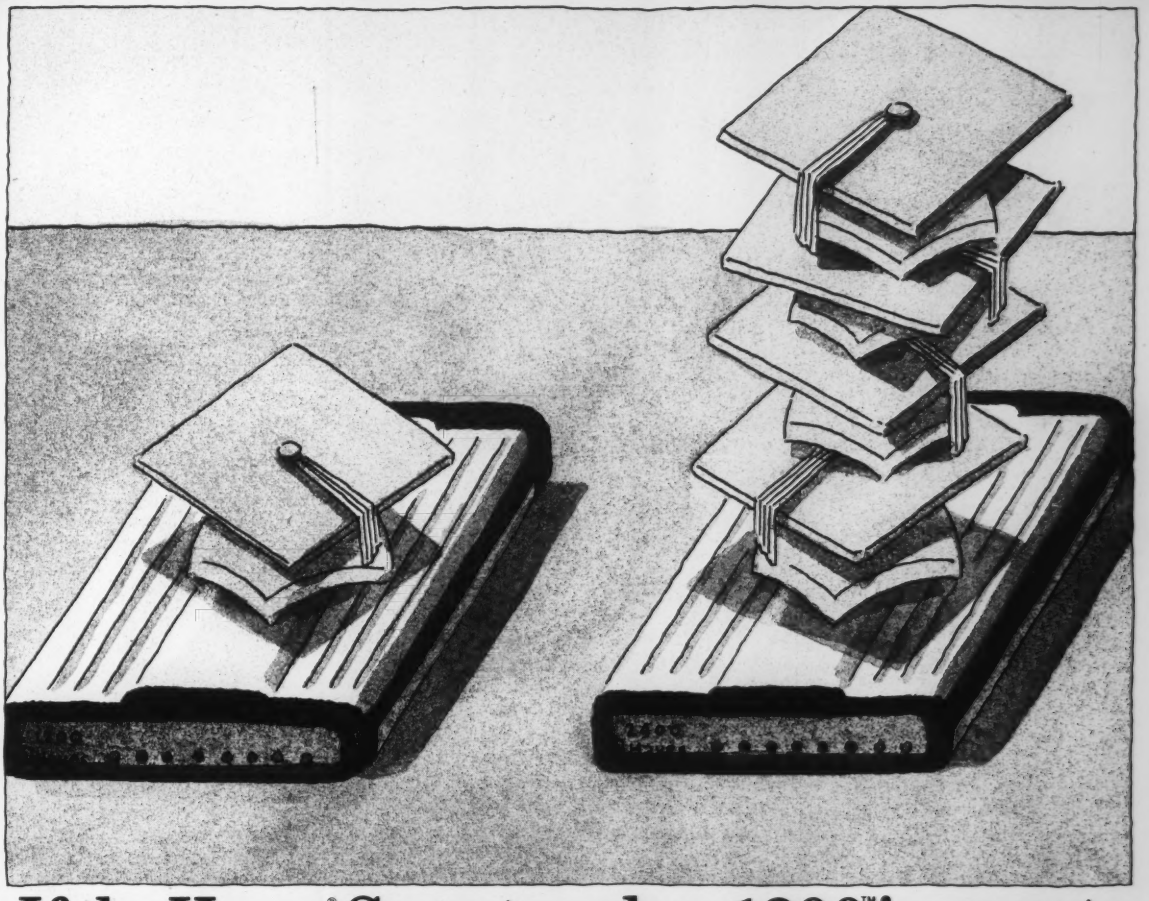
Giant Zoid

Combining two timeless areas of interest for precocious youngsters and unaffected adults, Tomy has created a mechanized robot in the form of a dinosaur. Available in Tyrannosaurus and Stegosaurus models, the giant battery operated Zoids come in kit form and can be easily assembled even by jaded adults.





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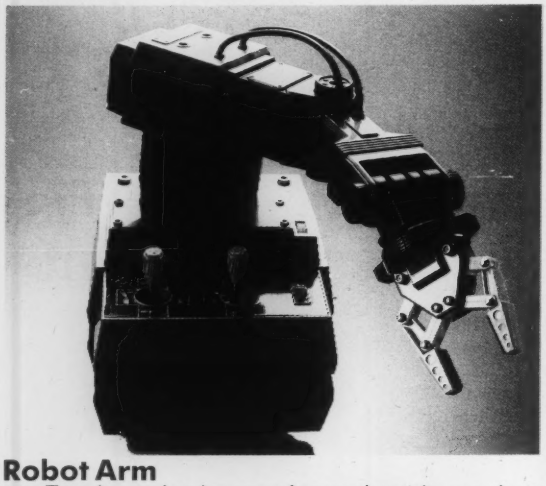

Robot Arm

Tomy's amazing Armatron has two joysticks to activate its four joints and hand gripper for total control. Two joints rotate right and left and two swivel up and down. The hand rotates and rubber coated pinchers open and close. A built-in timer lets you match skill against an opponent picking up and moving the included balls, cylinders, and cones. Highly addictive for adults and youngsters alike. Available from Radio Shack. $29.

Attache Tool Kit

You need a #1 Phillips head screwdriver and remember you left it in the garage so you try to make do with a #2. One tip is broken off your needle nose pliers because your son used it as a pry bar. And your tape measure is now in your wife's sewing kit. Sound all too familiar? An attache tool kit with a place for every tool will keep your tools from getting lost, make it easy to carry all your tools to the job, and make sure you always have the right tool for the job. Although widely available, we found the widest choice and best values were offered by Jensen and SPC. Pictured is the popular Jensen JTK-17 for $349. Other kits cost $165 to $599. Attache cases with tool holders (no tools) cost $80 to $200.

Photograph courtesy of Jensen Tools, Inc.

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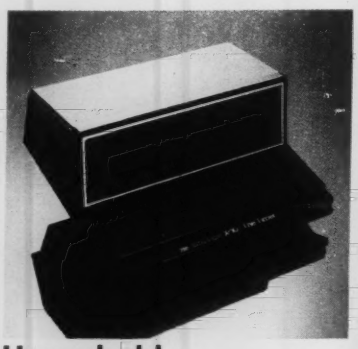


Household Control System

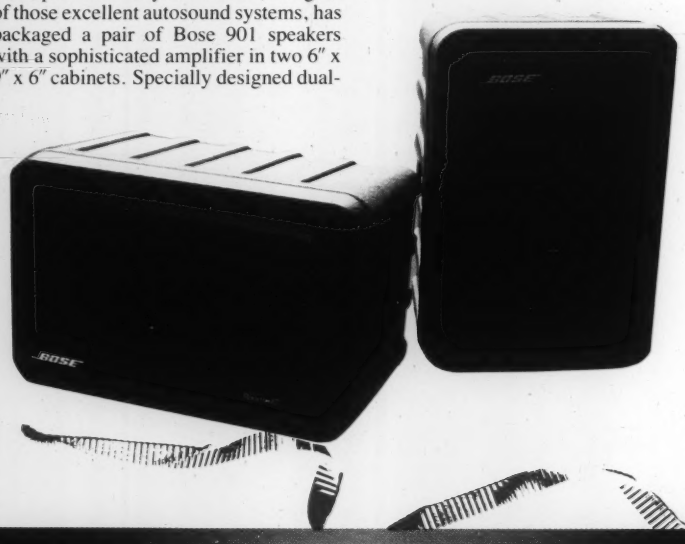
Here is protection and convenience rolled into one compact unit. This solid state remote control timer can turn on and off up to 16 electrical devices at two preset on/off times per day. Security feature varies on/off times to give house a "lived in" look while you are away. Sleep button lets you turn any device on for an hour. Battery backup operates timer during power outages. Controls lights, stereo, TV set, fan, coffee pot, and other appliances. Sold under BSR, Leviton, Sears, and Radio Shack brand labels. Timer $59, lamp and appliance modules $17 each.

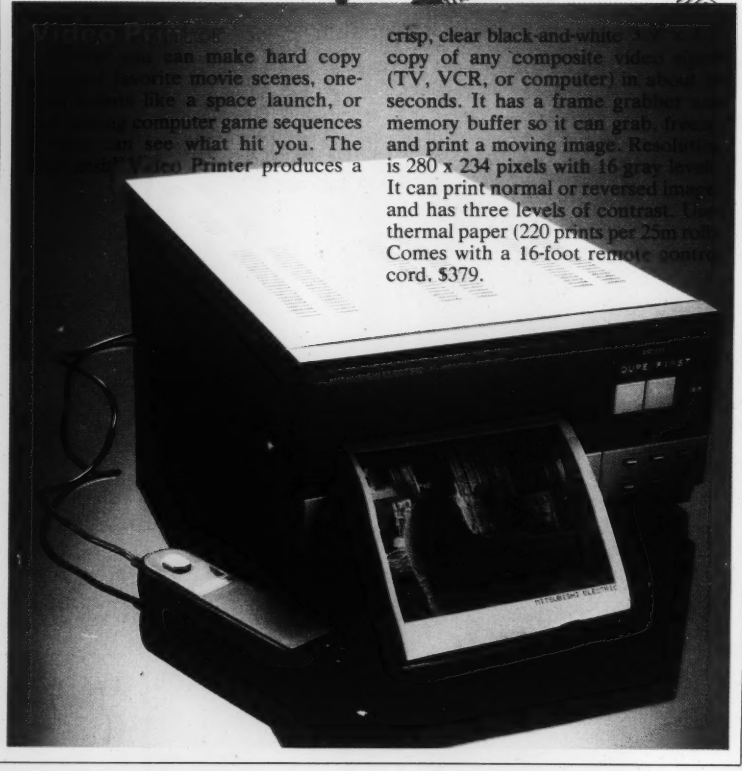
Krypton/Lithium Flashlight

How often have you switched on a flashlight to find it dim and fading just when you needed it most? Tekna's waterproof Micro-Lith runs on a lithium battery that has a higher energy density (more hours of use) and longer shelf life (10 years with no loss of charge) than any other battery. It is just 4″ long and very lightweight. But with its special krypton gas bulb, it is twice as bright as conventional lights the same size—and the bulb lasts twice as long. $19.

Compact Sound System

Want true hi-fi sound from your personal stereo, portable CD player, computer, VCR, or TV without hooking up to a component hi-fi system? Bose, designer of those excellent autosound systems, has packaged a pair of Bose 901 speakers with a sophisticated amplifier in two 6″ x 9″ x 6″ cabinets. Specially designed dual-tuned ports give the RoomMate system exceptionally deep, smooth bass that must be heard to be believed. $229.





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movie scenes, one-
like a space launch, or
computer game sequences
see what hit you. The
Printer produces a
crisp, clear black-and-white
copy of any composite video
(TV, VCR, or computer) in about
seconds. It has a frame grabber
memory buffer so it can grab, freeze
and print a moving image. Resolution
is 280 x 234 pixels with 16 gray levels.
It can print normal or reversed images
and has three levels of contrast. Uses
thermal paper (220 prints per 25m roll).
Comes with a 16-foot remote control
cord. $379.

Only from Topaz...

Line 2® Power Conditioners with PowerLogic® Control

The logical choice in computer-grade power

They're in a class by themselves.

Highly efficient and completely reliable, these microcomputer-based Line 2 Power Conditioners eliminate computer problems caused by power-line noise and voltage disturbances.

With exclusive Powerlogic control, our Power Conditioners are able to perform with exceptional speed and accuracy. An internal microcomputer monitors incoming power and instantaneously corrects overvoltages and undervoltages.

Harmful power-line noise is also eliminated. A built-in Ultra-Isolator® Noise Suppressor provides common-mode noise attenuation in excess of 2 million-to-one (126 dB).

Available in micro, mini, and mainframe models, Line 2 Power Conditioners feature computer-compatible design, durability and top performance.

Find out more about our new Line 2 Power Conditioners. Call us today at (619) 279-0831, or contact your local Square D distributor.

TOPAZ

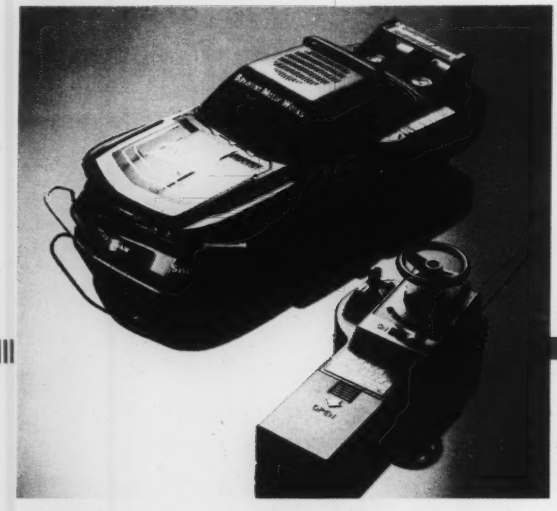
Excellence in Computer Power

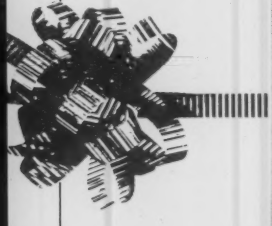
SQUARE D COMPANY

CIRCLE 154 ON READER SERVICE CARD

RC Vehicle

If you think RC cars are just for kids, think again. You can't imagine the thrill of taking the controls of a Porsche 935 Turbo—winding through turns and barreling down the straightaways—until you do it yourself. We tried every type of RC vehicle on the market and concluded that for maximum long-term use and satisfaction, the best bet is a vehicle with (1) variable speed, (2) forward and reverse, and (3) digital proportional steering to the right and left. Cars work best on smooth floors; for carpets or outside we recommend an off road vehicle. Our favorites: Porsche 935 Turbo (Sharper Image, $99), BMW 3.5 CSL (Pro/cision, $59), 4x4 Off-Roader (Radio Shack, $44).



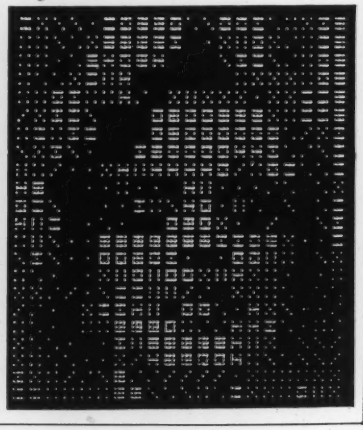


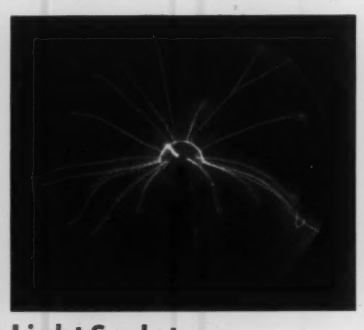
Compact Disc Player

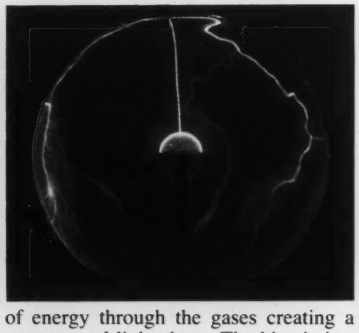
Total absence of surface noise. Freedom from hiss, rumble, and scratches. These were the promises of digital audio fulfilled by the introduction of the compact disc. Sony took the revolution one step further with its D-5 player, only slightly larger than the disc itself. The Technics SLXP7 is even smaller than the Sony and features full programmability including skip, repeat, and search. $299.95.

Domino Computer Art

Dominoes. Computers. A work of art. Sound like an unlikely combination? Read on. A computer was used to transform photos of famous people into patterns that can be formed with dominoes. It sounds strange, but the actual artwork is a real stopper. A kit comes with four sets of dominoes and your choice of image: Marilyn Monroe, Charlie Chaplin, Groucho Marx, Albert Einstein, George Washington, or Abraham Lincoln. A completed picture measures 17″ x 19″. $30 for the kit, $10 for each additional image. ■







Light Sculpture

The most unusual and elegant item in our collection, the Parker light sculpture all but defies description. It must be seen, not only to be appreciated, but to be fathomed.

Sculptor Bill Parker creates a miniature atmosphere of superpure gases in a glass sphere. From the base of the sculpture, an "electronic imager" programmed by the artist, broadcasts waves of energy through the gases creating a supernatural light show. The kinetic image contained within the globe can be changed by the viewer, either by adjusting the controls found on the base or by touching the globe with his hand—truly the ultimate in interactive, high tech fine art.

For more information, contact The Studio for Visual Technologies in Fine Art, 652 Glenbrook Rd., Stamford, CT 06906. (203) 348-1574.

Light sculpture photographs courtesy of The Studio for Visual Technology in Fine Art

READ ONLY

A review of the IBM Personal Computer Family. Vol. 2, No. 3

HARDWARE NEWS

A growing family of PC Printers.

Different jobs demand different printers. IBM has developed a full line of printers for its Personal Computer Family to answer those demands. Two of the most recent—the IBM Proprinter and the IBM Color Jetprinter—deserve special mention.

Both are compatible with the IBM PC Family of Personal Computers as well as with many other leading home and office personal computers. And both offer the traditional high standard of IBM reliability and support.

The IBM Proprinter.

The IBM Proprinter alone can help you complete a variety of different home or office jobs.

It has an unusual feature that will be welcomed by everyone who has spent time switching back and forth from single-sheet to continuous forms printing. A special slot in the front of the Proprinter allows you to print single pages or envelopes quickly and easily without removing the continuous forms paper.

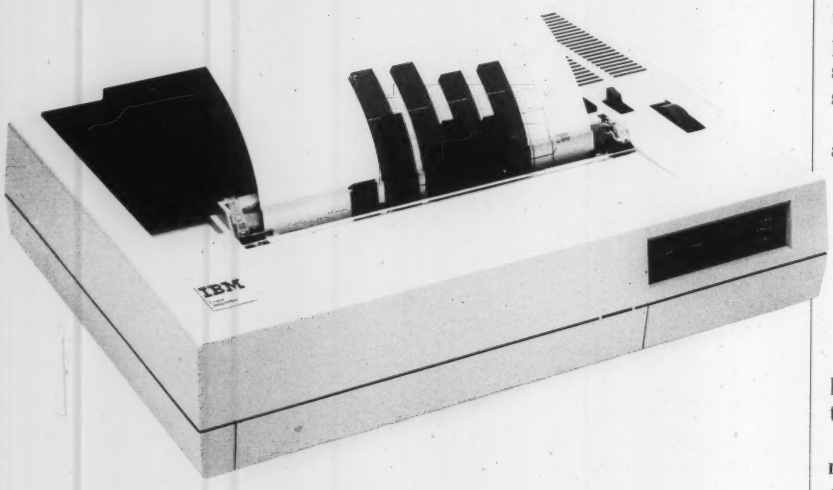
The Proprinter's high-speed (200 cps), dot-matrix technology can make short work of your day-to-day printing tasks like first drafts of letters or reports.

For more finished work, the Proprinter does near-letter-quality printing (at 40 cps) and lets you add emphasis to your text (at 100 cps) with bold print, condensed print and underlining.

It also has all-points-addressable graphics capabilities that can help you produce a complete range of charts and graphs to illustrate your text.

One additional plus: it's very competitively priced.

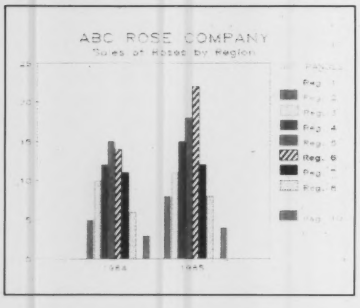
IBM Proprinter has a convenient slot for printing envelopes or single pages.



IBM Color Jetprinter quietly utilizes "drop-on-demand" ink jet technology.

The IBM Color Jetprinter.

The IBM Color Jetprinter is an unusually quiet, compact workstation printer that utilizes advanced "drop-on-demand" ink jet technology.



Samples of color graphics and texts produced by IBM Color Jetprinter.

Designed to be used with the IBM PC and many other personal computers, it's supported by a wide selection of software programs.

You can use it to produce draft and near-letter-quality text and high-quality graphics in up to seven colors.

In addition, the Jetprinter allows you to highlight your text with bold and underlined passages done in color or printed against a background color.

The Color Jetprinter also prints graphs, charts, engineering drawings and texts directly onto special Jetprinter transparencies for presentations.

And, thanks to a unique nonclogging ink formula, it performs all these functions very reliably.

FAMILY TIES

Videotex connections.

Videotex provides a key to much of our future shopping, entertainment and business information. Videotex services, using existing telephone lines, already supply travel information, personal shopping options and personalized messaging, banking and investing services.

PC Videotex software from IBM allows you to access these services from your IBM Personal Computer, IBM Personal Computer XT.™ IBM Personal Computer AT® or IBM PC*jr*.™

With only a few simple commands, you can use your IBM PC to receive, display, store and replay the data you choose in high-resolution color graphics and texts.

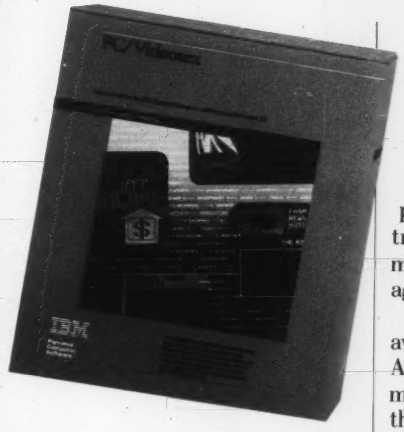
And if you need more than information retrieval, PC Videotex, in certain configurations, can be used to support your own Videotex data base.

WHAT'S THE PROGRAM?

Create your own presentations.

Everyone who has ever put together a visual presentation for a business meeting or other educational purpose can now take heart. With the help of IBM PC Storyboard software, an IBM PC and a color graphics monitor you can turn out professional-looking, captivating presentations complete with color, special effects and eye-catching graphics.

PC Storyboard's four modules—Picture Taker, Picture Maker, Story Editor and Story Teller—make it fast, easy and comparatively inexpensive to create, combine and modify pictures and stories. There's even an animation function that makes it possible for birds to fly, ships to move across water, words to become bigger.



IBM PC Videotex software makes Videotex connections in high-resolution color graphics and text.

Picture Taker lets you store the contents of screen displays from software you regularly work with, such as spreadsheet, business graphics, drawing or word processing programs.

You can use the Picture Maker module to edit and combine the graphics you've saved. Picture Maker also allows you to create completely new pictures containing both text—in a variety of type styles—and graphic figures.

Story Editor helps you organize and edit your pictures into a presentation and add various special effects. The results can be dramatic.

You can then use the Story Teller module to display the results on an IBM PC Color Display, on a TV or with a video projector.

The finished presentation can be copied on diskettes for distribution. You can also produce printed copies with a graphics printer like the IBM Color Jetprinter reviewed in this issue of *Read Only*.

After that, all you need is a director's chair from which to view the finished product.

Expand capabilities with IBM Planning Assistant Solutions, IBM Document Retrieval Assistant and PC Storyboard software.

Information at your fingertips.

A few months ago in this space, we reviewed Office Correspondence Retrieval System (OCRS) software from IBM, which provides a convenient way to keep track of information that otherwise might be filed and never found again.

That same application is now available as a member of the IBM Assistant Series, with an easy-to-use menu system that's consistent with those found in other Assistant Series programs.

Like the original OCRS software, IBM Document Retrieval Assistant makes life much easier for anyone who stores large amounts of information on a fixed disk or who has a library of documents, memos or files stored on diskettes.

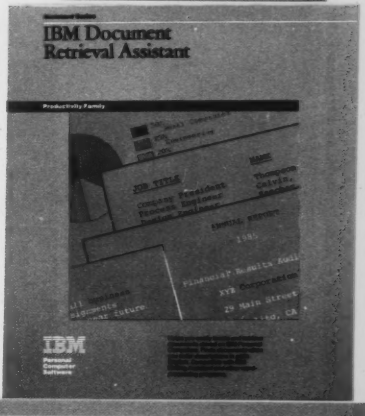
First, it automatically summarizes information and stores it for future reference. Second, and most important, Document Retrieval Assistant allows you to locate information with simple English-language queries.

Among other popular word processing software, Document Retrieval Assistant works with IBM Writing Assistant, IBM PCWriter, the IBM DisplayWrite Series, and WordStar® (version 3.10 or higher).

WordStar is a registered trademark of MicroPro International Corporation.

Financial planning.

Life is riddled with seemingly straightforward questions that result in headaches instead of answers. Questions like, "What's my net worth?" and "How much will my monthly payments be?"



IBM Planning Assistant Solutions and IBM Planning Assistant work together to help you find the answers even if you're not familiar with the math involved. All you have to do is fill in the required information on simply designed spreadsheets. Your IBM Personal Computer does the hard part.

Planning Assistant Solutions includes spreadsheets like Loan Calculation and Real Estate Analysis for home use. Others, like Travel Expense Form and Financial Statement Worksheet, can help you sort out your business finances.

Many of the spreadsheets can use information from files you've created with IBM Filing Assistant. You can also include the results of your Planning Assistant Solutions work in IBM Writing Assistant documents and present them graphically with IBM Graphing Assistant.

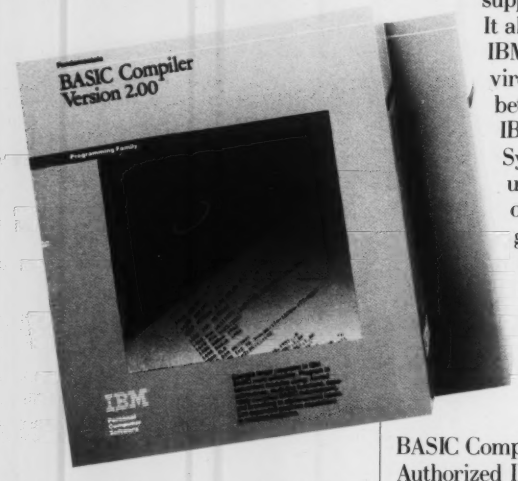
BASIC improvements.

It's good to know that in a business based on technological advances, the basics aren't forgotten.

The IBM BASIC Compiler 2.00 gives exactly that reassurance. It's an improved version of an indispensable business programming tool for the entire Family of IBM Personal Computers.

Among many significant improvements, the most recent version of IBM's BASIC Compiler includes better program control structures, allows you to compile larger programs and supports larger arrays. It also supports the IBM PC Network environment, provides better access to your IBM Disk Operating System (DOS), runs under TopView, and offers expanded graphics capabilities.

And there's a trade-up offer for current licensees that represents a significant savings on the IBM BASIC Compiler 2.00. See your Authorized IBM Personal Computer Dealer or IBM Product Center for details.



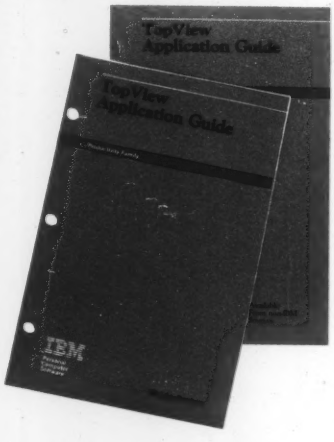
IBM BASIC Compiler 2.00 updates an indispensable business programming tool.

HARDCOPY

Guides to the top.

IBM TopView™ is a program that allows you to run more than one program at a time (multitasking) and to view screens from more than one program on your display (windowing). This, in turn, makes fast work of switching back and forth among programs that you use frequently—word processing, filing and spreadsheet applications, for example.

The TopView Application Guides shown below are now included when you purchase a TopView program. They're useful listings of the many programs—IBM applications and software from non-IBM sources—that can be used with TopView. Both are arranged alphabetically and include special operating considerations and notes whenever necessary.



TopView Application Guides now included with the program.

IBM®

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For more information about IBM Personal Computer products discussed in this issue of *Read Only*, see your Authorized IBM Personal Computer Dealer or IBM Product Center. Or call 800-447-4700. In Alaska call 800-447-0890.

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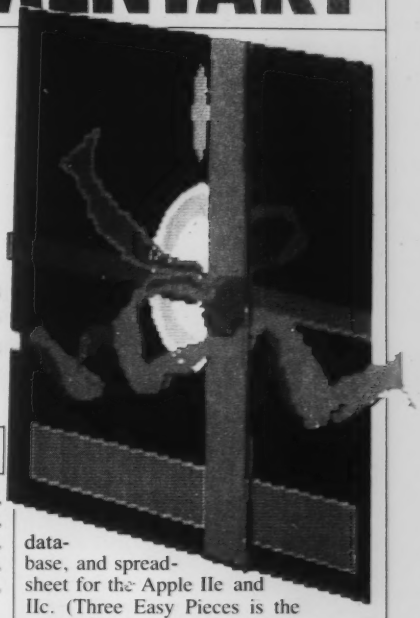
SOFTWARE COMMENTARY

Top choices for holiday giving and getting



From the scores of products we have seen or reviewed this year, here are 49 packages that stand out. All of them represent good value for the price, all of them perform as advertised, and all of them are relatively easy to learn and easy to use. We recommend them.

Productivity and Programming

Microsoft Word

Now available for both IBM PC and Macintosh, Microsoft *Word* has earned a reputation for flexibility and competence among its users. Although replete with features and functions, the program is so well constructed that a beginner can begin processing words right away, learning to use the bells and whistles as need requires and time permits.

Macintosh, IBM PC ($195). Microsoft, 10700 Northrup Way, Box 97200, Bellevue, WA 98009, (206) 828-8080, (800) 426-9400.

Paper Clip

Paper Clip is a word processor for low end computers that offers many of the advanced features usually found only on programs for much more expensive machines. It is, without doubt, one of the very best word processors on the market for Atari and Commodore computers—and it is reasonably priced.

48K Atari 400/800 XL/XE ($50), Commodore 64, Pet ($60). Batteries Included, 30 Mural St., Richmond Hill, Ontario L4B 1B5, (416) 881-9941.

WordPerfect

WordPerfect gets better and better. The newest release, version 4.1, includes support for more than 100 printers, an expanded (and accelerated) dictionary with typographical checker, a thesaurus, on-screen columns, improved file management, split-screen, sorter, and dozens of other extensions and improvements. A $95 option gives you SSI's excellent text editor, p-Edit, a macro editor, and calculator and calendar accessories. This is truly a top-of-the-line word processor.

IBM PC ($495), Apple II ($180), Tandy 1000, 1200, 2000, Victor 9000, DEC Rainbow, TI Pro, Zenith, Apricot, DG/1, NEC APC3 ($495). SSI Software, 288 W. Center St., Orem, UT 84057, (800) 224-4000, (801) 227-4000.

Mouse Write

Mouse Write is a Macintosh-like word processor for the Apple II that makes full use of the mouse/window user interface. It offers all of the functions we have come to expect in a full-featured word processor as well as the ability to calculate the Fog Index of a document.

Apple IIc and 128K enchanced IIe ($125). Roger Wagner Publishing, Inc., 10761 Woodside Ave., Ste. E, Santee, CA 92071, (619) 562-3670.

ThinkTank

ThinkTank is an idea processor designed to streamline the task of organizing your thoughts for that important report, thesis, or book. With this program, you can rearrange and augment your ideas without any logistic effort whatsoever; your ideas flow freely, and your project quickly begins to feel organized. In its Macintosh incarnation, *ThinkTank* can even store pictorial information as *MacPaint* documents.

512K Macintosh ($245), 128K Macintosh ($145), IBM PC/XT/AT ($195), Apple II and III ($150). Living Videotext, 2432 Charleston Rd., Mountain View, CA 94043, (415) 964-6300, (800) 822-3700, in CA (800) 443-4310.

AppleWorks

AppleWorks is an integrated package which includes a word processor, database, and spreadsheet for the Apple IIe and IIc. (Three Easy Pieces is the equivalent product for the Apple III.) While the three parts do not share a common environment, you can have up to 12 files on the "desktop" at one and move from one file to another in four keystrokes. The package is marked by its ability to accept input, manipulate data within and among files, and format for both display and printout.

Apple II ($295). Apple Computer, 20525 Mariani Ave., Cupertino, CA 95014, (408) 996-1010.

Megaworks

Apple IIe and IIc owners who use *AppleWorks* will welcome *Megaworks*, a utility package that adds mail merge capability and a 40,000-word spelling checker. *Megaworks* makes *AppleWorks*, a fine program in its own right, even better.

128K Apple IIe, IIc ($125). Megahaus, 5703 Oberlin Dr., San Diego, CA 92121, (619) 450-1230.

Framework II

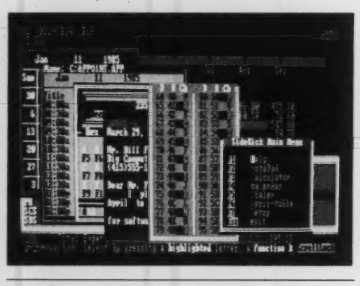
This latest version of *Framework* contains a larger, faster, and more powerful spreadsheet and an advanced word processor that includes an 80,000-word spelling checker, visible page breaks, and mailmerge. These applications are supported by integrated telecommunications, database, outlining, and graphics modules. In addition, Fred, the well documented programming language included with the package has been expanded.

IBM PC/XT/AT/3270 ($695). Ashton-Tate, 10150 W. Jefferson Blvd., Culver City, CA 90230, (213) 204-5570.

Mouse Calc

Mouse Calc, an easy-to-use but full-featured spreadsheet, makes outstanding use of the mouse-user interface with its pull-down menus and flexible windows. It allows easy creation and printing of colorful line and bar graphs. Also designed by Version Soft, a French company, are *Mouse Word* ($129) and *Mouse Budget* ($69).

Apple II ($149). International Solutions, 910 W. Maude Ave., Sunnyvale, CA 94086. (408) 773-0443.



Sidekick/Superkey

This packaged pair of productivity programs can pave over a peck of problems. *Sidekick* delivers a notepad, calculator, calendar, Rolodex, ASCII table, and autodialer at the press of a key or mouse button. *Superkey* (for the IBM) offers macros and a data encryption scheme. Both memory-resident programs are inexpensive and effective.

IBM PC ($70), Macintosh ($85). Borland International, 4585 Scotts Valley Dr., Scotts Valley, CA 95066, (408) 438-8400.

MacOneWrite

The *MacOneWrite Cash Disbursements* package replaces the familiar one-write checkbook binder with the power and graphics of the Macintosh. As you enter the checks to be printed, the program automatically posts the disbursement and balances your accounts. Reports prepared by the *Cash Disbursements* program include a cash disbursements journal, a year-to-date vendor report, a balance sheet, and a cash-basis income statement.

Macintosh ($249). Sierra On-Line, Coarsegold, CA 93614, (209) 683-6858.

Dollars & Sense

Dollars & Sense is the nucleus of Monogram's family of money management programs. It is a comprehensive database that allows you to compare your personal or small business spending against a budget, produce income statements, and chart various trends and account breakdowns. Related programs include *Forecast* for tax planning, and *Moneylink*, the latest entry, for up- and down-loading data from your accounts at Citibank, Bank of America, and other financial institutions.

IBM PC, TI Pro ($180 with *Forecast;* Macintosh ($150); Apple II, IIe ($100), IIc ($120). Monogram Software, 8295 S. La Cienega Blvd., Inglewood, CA 90301, (213) 215-0355.

The Home Accountant

The Home Accountant is a serious, comprehensive program designed to help you keep track of your personal finances. From balancing your checkbook to creating graphs and trend analyses for various budget categories, the program provides an overview of your financial situation that can be as simple or as complex as you want it to be.

IBM PC/XT, Macintosh ($150), Commodore 64, Atari, Apple II ($75). Haba/Arrays, Inc., 6711 Valjean Ave., Van Nuys, CA 91406, (800) HOT-HABA, in CA (800) FOR-HABA

TRS-80 Model III, 4 ($99). Available at Radio Shack Computer Centers.

Managing Your Money

The latest version (2.0) of this popular personal finance program offers additional features for professional and small business use. New features include accounts payable and receivable, five-year budget and tax forecasting, buy vs. lease comparisons, mortgage refinancing, inflation/deflation calculator, invoice printing, an auto dialer, and more.

IBM PC/XT/AT, Tandy 1000, 1200, Compaq ($200). MECA 285 Riverside Ave., Westport, CT 06880, (800) 631-MECA, (203) 222-9087.

Personal Planner

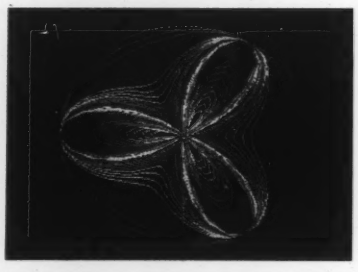
If you think that tax accounting programs are just for professionals, have a look at *Personal Planner* from CPAids. It requires only 54 entries to calculate your tax liability and can be used to plan for retirement, investing, and two-incomes.

IBM PC, Apple II, DEC Rainbow, CP/M 2.0, MS-DOS, PC-DOS ($50). CPAids, 1061 Fraternity Cir., Kent, OH 44240, (800) 227-2437, (216) 678-9015.

Super Logo

Super Logo, an enhanced version of Color Logo for the the Tandy Color Computer. In addition to standard Logo features, *Super Logo* offers multiple turtles, animation, line-oriented editing of *Super Logo* programs, list processing capabilities, and use of variables and arithmetic expressions in programs.

Tandy Color Computer ($99). Available at Radio Shack Computer Centers.



True Basic

John Kemeny and Thomas Kurtz, creators of original Basic, have taken the language back to its roots, added some new commands and a great deal of structure, and created a dynamic new tool for programmers—novices and hackers alike. True Basic is powerful, comprehensive, and flexible—unquestionably an excellent language.

IBM PC, Macintosh ($149.90). Addison-Wesley Publishing Company, Reading, MA 01867, (617) 944-3700.

Mac Basic 2.0

Microsoft Basic 2.0 for the Macintosh was the first Basic to satisfy the longing of Mac-owning programmers for a language that would allow them to experiment with the wonderful tools hidden inside the little beige box. Although cut from the same cloth as the original Mac Basic Version 1, the new language has been significantly enhanced and is now among the most advanced Basic interpreters available for any microcomputer.

Macintosh ($150). Microsoft, 10700 Northrup Way, Box 97200, Bellevue, WA 98009, (206) 828-8080, (800) 426-9400.

Filevision

Filevision for the Mac ($195) and its big brother, *Business Filevision* for the Fat Mac ($395) are full-function filing systems that allow you to create text, annotation, and computed fields. What makes them unique is the ability to file drawings as "intelligent pictures" from which you can retrieve data by pointing to a part of the picture. These images can be created by ***Filevision*** or by other Mac programs. Reports can have up to a 30" x 30" print area, and a large library of templates is available at modest cost.

Macintosh. Telos Software, 3420 Ocean Park Blvd., Santa Monica, CA 90405, (213) 450-2424.

Executive Filer

An outstanding card filing system, *Executive Filer* uses the card-drawer-cabinet motif; each card holds up to 8000 characters, and you can stuff up to 64,000 cards into one cabinet. The program offers an efficient, straightforward filing system that even a novice can have up and running in minutes.

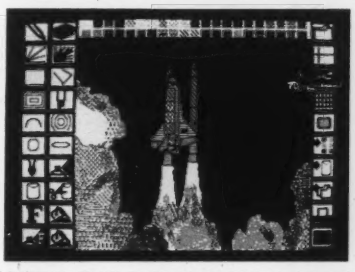
IBM PC ($50). Paperback Software, 2612 8th St., Berkeley, CA 94710, (415) 644-8249.

Boston Computer Diet

The Original Boston Computer Diet program tailors a personalized weight loss and physical fitness program from data you supply about your height, weight, eating habits, and psychological and behavior traits. Record keeping, progress reports, and summaries of food intake can be examined on-screen or in printed reports.

IBM PC, PCjr, Apple II ($80); Commodore 64 ($50). Scarborough Systems, 55 South Broadway, Tarrytown, NY 10591, (914) 332-4545.

Graphics



Art Studio

Art Studio, a *MacPaint* lookalike for the IBM PC, has all the icons you could desire, including concentric circles and squares, an arc, and radial lines. More than 40 patterns are available, and the ability to capture screens from Basic programs, Lotus *1-2-3*, and other paint programs can be a real boon.

IBM PC ($50). Spectrum Holobyte, 1050 Walnut, Suite 325, Boulder, CO 80302, (303) 443-0191.

Fluent Fonts

Fluent Fonts is a two-disk collection of 48 high quality type fonts, including math, architectural, electronic, and astronomical symbols; nine foreign alphabets; two sets of images and borders; and a wide variety of specialty fonts.

Macintosh ($50). Casady Computing, Box 223779, Carmel, CA 93922, (408) 646-4660.

Mac the Knife

Mac the Knife is a series of three treasuries of clip art for non-artists who want to make use of the graphics power of the Macintosh. Volume 1 ($40) contains over 500 relatively modern illustrations. Volume 2 ($50) includes interesting type fonts, and Volume 3 ($60) offers remarkably detailed holiday illustrations.

Macintosh. Miles Computing, 21018 Osborne St., Bldg. 5, Canoga Park, CA 92304, (818) 341-1411.

Dotwriter 4.0

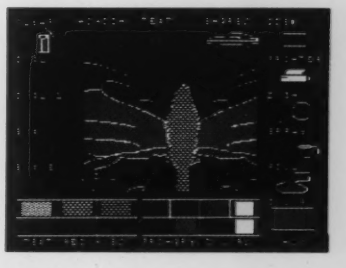
Dotwriter 4.0 allows you to produce stylized text with your TRS-80. Offering more than 230 different typefaces, the program also allows you to experiment with variations like double-width, double-strike, and emphasized printing. A set of 65 imbedded codes puts heretofore undreamed of printing power at the command of Tandy users.

TRS-80 Models I, III ($80), and 4 ($100); extra font disks, ($25). Prosoft, Box 560, North Hollywood, CA 91603, (818) 764-3131.

The Print Shop

The Print Shop puts professional quality computer graphics within the reach of the novice user—and the unimaginative experienced user. Using the shapes and pictures, typefonts, borders, and backgrounds that come with the package (as well as those in the supplementary Graphics Library packages), you can create posters, flyers, letterheads, greeting cards, and all the other graphics projects you were previously able to fob off on others because you can barely print your name legibly. *The Print Shop* is the graphics program for The Rest of Us.

Apple II, Macintosh, Commodore 64, Atari 400/800. ($45). Broderbund Software, 17 Paul Dr., San Rafael, CA 94903, (415) 479-1170.



Blazing Paddles

Apple II and C64 users in search of a *MacPaint*-alike program should take a look at *Blazing Paddles*, a fast, fun, easy-to-use graphics program. With the exception of a true cut feature, all the functions you could want are available at the click of a mouse button.

Apple II ($50), Commodore 64 ($35). Baudville, 1001 Medical Park Dr., Grand Rapids, MI 49506, (616) 957-3036, (800) 824-8873.

PC Palette

PC Palette is a drawing, painting, and graphing program that represents a very inexpensive way to obtain such graphics capability on IBM computers. Don't let the price fool you: *PC Palette* is a full-featured product that delivers many special effects, including rotation, scaling, and even animation. Best of all, it works well from the keyboard and does not require additional hardware—an extraordinary value.

IBM PC ($40). Personally Developed Software, IBM, P.O. Box 3280, Wallingford, CT 06494, (800) IBM-PCSW.

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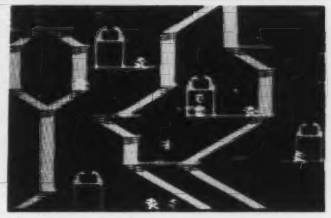
Entertainment



Bounty Bob Strikes Back

Bounty Bob Strikes Back, a climbing, jumping, twisting, subterranean arcade game, will hold your interest and entertain you long after other games have been retired to your never-used-software shelf. The object is to cement blocks in place, grab treasures, and vanquish the denizens of the mine. The 25 screens offer more than adequate challenge for even veteran joystick jockeys.

Atari cartridge ($45), Commodore 64 disk ($35). Five Star Software, P.O. Box 9078-105, Van Nuys, CA 91409, (818) 782-6861.

Jet

Sublogic has entered the high tech age with a flight simulator that puts you at the controls of a land-based F-16 or aircraft carrier-based F-18. Dogfights, tactical bombing missions, and just plain flying create the excitement, and surprisingly good graphics add to the enjoyment of *Jet*.

IBM PC ($50), Commodore 64 ($40). Sublogic, 713 Edgebrook Dr., Champaign, IL 61820, (217) 359-8482, (800) 637-4983.

Balance of Power

Balance of Power by Chris Crawford is an unbelievably realistic simulation of the dynamics of world politics today. You become the leader of either the U.S. or the U.S.S.R., but you must take into account the actions of 40 other nations as you try to avoid a nuclear conflict and preserve the balance of power.

Macintosh ($50). Mindscape, 3444 Dundee Rd., Northbrook, IL 60062, (800) 221-9884 in IL, (800) 942-7315, (312) 480-7676.

Skyfox

Astounding graphics and fast action combine to make *Skyfox* a winner of a shoot-'em-up. A cross between Han Solo and Dirty Harry, you streak over the landscape in a high tech fighter defending your planet from alien invaders. Fifteen scenarios and multiple skill levels provide enough variety and experience to challenge even the most advanced arcader.

Apple II ($40), Commodore 64 ($33). Electronic Arts, 2755 Campus Dr., San Mateo, CA 94403, (415) 571-7171.

Road Rally U.S.A.

Road Rally puts you in the driver's seat, requiring you to use your knowledge of history and geography to find key locations and earn points. The game is loads of fun for the whole family—the sort of game that can be enjoyed by a group of friends, even though only one actually drives the car.

IBM PC, PCjr, Apple II, Commodore 64 ($40). Bantam Electronic Publishing, 666 Fifth Ave., New York, NY 10103, (800) 223-6834 ext. 832, (212) 765-6500.

Kennedy Approach

This addictive gem is a simulation of air traffic control at one of five airports. Storms, through flights, emergency landings, and differing airspeeds for different types of aircraft add to the challenge of this nerve-wracking game. A fantastic speech synthesis system makes the simulation all too real.

Atari, Commodore 64 ($35). MicroProse Software, 120 Lakefront Dr., Hunt Valley, MD 21030, (301) 667-1151.

Hacker

Hacker is an adventure that captures all of the excitement (and none of the danger or illegality) of using your computer to tap into the mainframe of a large corporation. Within the databanks of the mythical mainframe, you discover a plot to dominate the world. Your job is to thwart this nefarious plan. Hacker is well designed and challenging, and avoids with savvy the inevitable frustration of goal-based adventure gaming.

Apple II ($40), Commodore 64/128 ($30), Atari XE/XL ($25). Activision, P.O. Box 7287, Mountain View, CA 94039, (415) 960-0410.

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SOFTWARE COMMENTARY

Mindwheel

With *Mindwheel*, Synapse joins the ranks of the interactive fiction greats. Written by a poetry editor, the prose spins off images of time and space in a tale worthy of Dante's Inferno. *Mindwheel* is a must for adventure game enthusiasts.

IBM PC, Apple II, Macintosh ($45), Commodore 64, Atari ($40). Synapse Software, 17 Paul Dr., San Rafael, CA 94903, (415) 479-1170.

Deja Vu

Deja Vu is a detective adventure that takes full advantage of the point and click interface of the Macintosh to make movement through the game painless and crisp. As you move through the scenario, each location is rendered beautifully in Macintosh hi-res, and the artifacts you encounter can be "handled" in a manner unique in computer adventures. Many of the objects you find can open into windows; double clicking the briefcase, for example, opens a window displaying its contents.

Macintosh ($55). Mindscape, 3444 Dundee Rd., Northbrook, IL 60062, (800) 221-9884, in IL, (800) 942-7315, (312) 480-7667.

Education

The Oregon Trail

What was it like to cross the country by covered wagon in 1848? Playing *The Oregon Trail*, an updated version of a classic simulation, will give you a good idea of the hazards and rewards of making the 2000-mile journey during pioneer days. The program uses both text and graphics to guide you on your exciting trip.

Apple II, ($49). MECC, 3490 Lexington Ave. N., St. Paul, MN 55126, (612) 481-3500.

Stickybear Typing

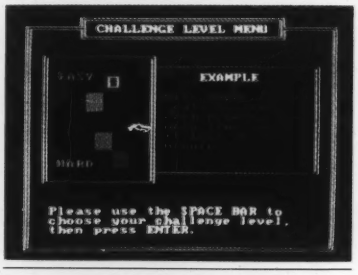
The latest in the delightful Stickybear line from Weekly Reader Family Software is *Stickybear Typing*, a program designed to teach the basics of touch typing. Once you have mastered the fundamentals, a game and a series of story excerpts encourage you to practice your skills.

Apple II, ($40), Commodore 64 ($25). Weekly Reader Family Software, 245 Long Hill Rd., Middletown, CT 06457, (203) 347-7251, (800) 852-5000.

Ranch

Ranch is an educational graphics program that encourages children ages five to ten to experiment with design and composition by combining characters and shapes to create pictures. Simple menu commands select and manipulate the elements and allow the child to animate his creation.

Commodore 64, Atari cartridge ($25). Spinnaker Software, 1 Kendall Square, Cambridge, MA 02139, (617) 494-1200, (800) 323-8088.



Discovery Software

Discovery Software from World Book is everything educational software should be. All three levels—Preschool, Primary, and Secondary—offer programs that are entertaining, competently executed, and pedagogically sound. Equally appropriate for home and school, Discovery Software is an excellent choice for any child who enjoys computerized learning.

IBM PC, PCjr, Apple II, Tandy 1000 ($40 each, $250 set of 7). World Book Discovery, Suite 120, 5700 Lombardo Centre, Seven Hills, OH 44131, (800) 292-9090, in OH (800) 423-7755.

Success With Math

The Success With Math series consists of eight packages, ranging from *Addition* and *Subtraction* (grades 1 to 4) to *Quadratic Equations* (grades 9 to 12).

The packages offer a good, comprehensive, self-paced approach to learning, which leads the student through the solution of the problem and ensures that he knows exactly where errors have been made.

IBM PC, PCjr, Apple II, Commodore 64, Atari ($25). CBS Software, One

Wishbringer

Wishbringer, although an adventure in the finest Infocom tradition, represents a departure from that tradition in that it can be played on two levels. Novice gamers are granted up to seven special wishes to help overcome obstacles to play. More advanced players can eschew the assistance and rely on their wits and experience to get them through the game.

Apple II, IBM PC, Kaypro, Macintosh, TRS-80 Model III, Atari ST, Amiga ($40); Commodore 64, Atari 400/800 ($35). Infocom, 125 Cambridge Park, Cambridge, MA 02140, (617) 492-6000.

Patchworks

Patchworks is a fascinating package designed to help hobbyists create geometric designs. By choosing shapes, rotating, duplicating, mirroring, and flipping them, you can create anything from a traditional Log Cabin pattern in red, white, and blue to a contemporary abstract design in fuschia and chartreuse. The program even calculates the amount of material needed to make the quilt you have designed.

Apple II ($60). Random House, 201 E. 50th St., New York, NY 10022, (800) 638-6460, in MD (800) 492-0782.

Fawcett Pl., Greenwich, CT 06836, (203) 622-2525, (800) 227-2754.

TRS-80 Model 4 ($20). Available at Radio Shack Computer Centers.

Math Blaster

Math Blaster has been on the educational software best seller list for months and months—and with good reason. The program provides an interesting and motivational approach to arithmetic drill and practice with some important extras—in particular, drill on fractions and decimals and the ability to enter your own problems. The program is well designed and graphically appealing.

Apple II, IBM PC, Commodore 64 ($50), Davidson and Associates, 3135 Kashiwa St., Palance, CA 90505, (213) 534-4070.

Math Magic

Math Magic is a fast, competitive, arcade-type game that helps children ages four to nine practice addition and subtraction skills as they attempt to defeat a series of monsters. Parents and teachers can modify game play according to the player's age and customize the game according to his needs and abilities.

Apple II, IBM PC ($40). Methods and Solutions, 82 Montvale Ave., Stoneham, MA 02180, (617) 438-5820, (800) 221-7911.

Evelyn Wood Dynamic Reader

The Evelyn Wood Dynamic Reader presents many speed reading exercises packed onto three disk sides. Macintosh-style pull-down menus efficiently control movement through the program, and readings are found both on- and off-screen. The manual covers specialized techniques for reading books, newspapers, magazines, and business correspondence.

Apple II, Macintosh ($70); IBM PC ($90); Commodore 64, Atari ($50). Timeworks, 444 Lake Cook Rd., Deerfield, IL 60015, (312) 948-9200, (800) 323-9755.

Financial Time Machine

Financial Time Machine is an accurate computer model (in game form) of the investment world from 1930 through 1984. With it, you can explore how 32 widely varied investments were affected by peace, political tension, war, depression, inflation, recession, and recovery. The game is realistic, challenging, and downright fascinating.

IBM PC/XT, PCjr, Commodore 64. ($60). Insight/Lehner Communications, 2708 Arlington, Highland Park, IL 60035, (312) 432-5458.

The Newsroom

Combining word processing with an extensive library of clip art, *The Newsroom* brings electronic publishing to the classroom. Art and text can be arranged on the screen to create layouts for newspapers, bulletins, advertisements, and other items that might otherwise have to be typed or professionally typeset.

Apple II, IBM PC/XT/AT, 256K PCjr, Commodore 64/128 ($60). Springboard Software, Inc., 7808 Creekridge Cir., Minneapolis, MN 55435, (612) 944-3912. ■

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SPECIAL SECTION

New Power For

The desktop publishing revolution/**Timothy Onosko**

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Conventional paste-up prepares graphic material for printing by physically combining a variety of elements on a "mechanical." Text galleys and titles are produced by different kinds of typesetting equipment, positioned with the aid of T-squares and fastened with glue or wax. Rules are mechanically inked or laid out with tapes. Blue guidelines are used because they are invisible to the film negatives which are eventually made from the mechanical. Pictures can be indicated on the mechanical and then added to the film negative. If they do not require separate halftones (the dot screens visible on photographs), they can be included on the mechanical as "line art" like the photostat above.

During the turbulent 1960s, A. J. Liebling quipped that "freedom of the press is guaranteed only to those who own one." Today, that means approximately 9150 daily and weekly newspapers and about 10,800 magazines, not to mention book publishers and small press operators. (More magazines are published today than 35 years ago, although the number of newspapers dropped by around 3000 during the same period.)

It has traditionally been difficult for small publishers to exist in the marketplace. Beyond the cost of printing, it is expensive and time consuming to have text set in type and a publication designed and produced. While it is entirely possible to publish anything—from handwritten text to typewriting—certain existing standards of typography and layout separate amateur publications from their professional counterparts.

These are not just aesthetic standards meant to make publications look more attractive. They are values that have evolved over the course of decades, even centuries, that make the written word more readable and understandable. A well-produced publication is to a sloppy one what a photograph is to a hastily-drawn sketch: It better conveys more information.

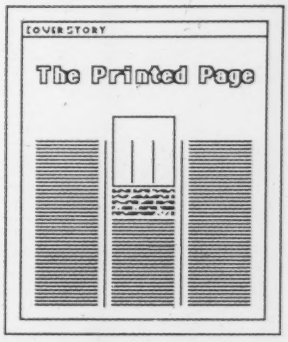
Ten years ago, the personal computer and word processing software changed the way text is prepared. Today new, more capable machines are quickly bringing the ability to set text in type and produce attractive, professional quality publications to almost anyone who wants or needs it. Because of the extraordinary power of these new systems, desktop publishing will, within the next few years, become as important to the future of personal computers as spreadsheets and word processors are today.

What comprises a desktop publishing system? The hardware key is, of course, a laser printer that can produce near-typeset quality text and graphics at resolutions of several hundred precise dots per inch. The "front ends" of these printers are personal computers with the power and screen resolution both to perform the complex computation required for typesetting and to visualize a page layout via high-resolution bit-mapped graphic video displays. For software, either a *typesetting* (or *composition*) *system* or a new kind of program called a *page processor* is necessary. Other kinds of new peripheral devices—graphic scanners, video still cameras, and optical character recognizers—will also play a role in desktop publishing systems.

Who will use these systems and why? Business people, long saddled with the responsibility of producing catalogs, price lists, advertising material, manuals, corporate reports, and the like, will find that a publishing project that once took weeks can be accomplished in days. Publishers

Photography by Jeff MacWright

The Printed Page



Microcomputer page make-up performs the combination of graphic elements electronically, not physically. This page was prepared with ReadySetGo 2.0 and a 512K Macintosh, and was printed on an Apple LaserWriter (courtesy of Prodigy Computer Center, East Hanover, N.J.). Text is accessed directly from word processing files and formatted along with added titles and captions from a menu of fonts, sizes, and styles. Rules, borders, solid blocks, and picture areas are also created and manipulated by menus. Pictures can be accessed from MacPaint, allowing the inclusion of digitized artwork from photographic or video sources.

of small newsletters, magazines, and trade journals will bring most if not all of their production process in-house.

The long-suffering editors of weekly and rural newspapers will enjoy the same cost benefits that their larger (and better funded) daily competition derives from automated typesetting and page make-up systems. Finally, many authors will at last have full control over the organization and appearance of their books, leaving the more difficult jobs of printing and distributing to their publishers.

(History shows a rich tradition of authors who became publishers. The most notable American example was Mark Twain, who successfully self-published his *Huckleberry Finn* and the *Memoirs of Ulysses S. Grant*, but lost a fortune pursuing the dream of automated typesetting years before the invention of the Linotype machine.)

Revolutions in Reproduction

Desktop publishing could well begin the same kind of blossoming that occurred after every major revolution in printing and publishing. Very simply, it could serve to inspire those who never considered becoming publishers. Desktop publishing will also offer enormous entrepreneurial opportunities for people who choose to provide publishing services to others. The graphic arts shop of the very near future will probably be a handful of talented people working at personal computers instead of drafting tables.

We take for granted the tens of thousands of quick-print and duplicating shops we find in almost every city and town in the United States. Yet fast, inexpensive photolithography was introduced only within the last two decades. This printing technique uses photography to produce a paper, plastic or metal "plate" from which copies can be printed directly. On the press, certain portions of the lithographic plate pick up ink and transfer it to the paper, producing the image.

In addition to lithography, the invention of the Xerox copier introduced electrostatic printing, which requires only an original copy and not a printing plate. An image is projected onto an electrically-charged drum or plate. Depending on where the light falls, the charge is retained and attracts powdered ink, called toner. This toner is then fused (with heat) to the surface of a sheet of paper, again producing a reproduction of the original image.

Electrostatic printing, or Xerography, is more expensive than lithography, however, and cannot offer the same quality of reproduction, especially for photographs. Nonetheless, this kind of reproduction is cost-effective for printing in limited editions, and its technology is the cornerstone of laser printing.

A laser printer is, essentially, a Xerox-type copier that requires no original. Instead, a laser-beam is used to trace an image directly onto the copier drum with a typical resolution of 300, 500, or 1000 dots to the linear inch. (Doing some math, a square inch would contain 90,000, 250,000 or 1 million individual dots.) Two other kinds of machines are related to laser printers.

The LCD (for Liquid Crystal Display) shutter printer uses the same kind of electrostatic method of reproduction, but instead of a laser, an array of microscopic shutters produces the image one line at a time. (Typically, the array is a single string of about 2000 of these LCD shutters.) The flow of light is controlled by the same liquid crystal effect you witness every time you look at a digital wristwatch. These shutters paint the image onto the copier drum. The advantage of LCD shutter printers is a reduction in the number of parts required by the laser scanner.

(Liquid crystal shutter printers are expected to make their appearance in the U.S. market early in 1986.)

The laser typesetter also uses a laser beam to make its images, but traces them directly onto photographic paper for the highest possible quality. Laser typesetters can produce type and graphics at the staggering resolution of 2500 or more dots per inch, but are typically much more expensive to buy and (because they are photographic devices) operate than laser or LCD shutter printers. LCD shutter printers, laser printers and laser typesetting machines are generically called *raster printers* because of the manner in which the laser draws the image, as a series of lines in much the same way a cathode ray makes a TV picture.

Even though laser and LCD shutter printers can be used to print the same kinds of routine documents for which daisywheel and dot matrix printers are used, the relatively high quality of the text and graphics they can produce makes them ideal for producing master pages—called *mechanicals* in the printing business—that will be reproduced by either photolithography or electrostatic printing. While, at 300 or 500 dots per inch, their resolution is not sufficient to match that of typesetting machines, laser-printed copy offers a significant improvement over typewritten text and can sometimes fool even the trained eye of a graphic arts professional.

The manufacturers of laser printers caution that laser printing *is not typesetting*, but with improved software control, it is obvious that laser printer typography can serve the needs of most users of conventional typesetting. Does this mean that typesetters will go the way of buggywhip manufacturers? No, but it does mean that fewer customers will require their services in the future.

All laser printers are not created equal. They are distinguished by the amount of control users have over their output. Early models emulated the operation of daisywheel printers, meaning that the same numeric codes controlled the placement of the text on the page. (The Canon LBP printer and Hewlett-Packard are two of these.)

Postscript

When Apple Computer explored the possibilities for a laser printer to be used in conjunction with the Macintosh and now defunct Lisa computers, it decided to employ a page-description language called Postscript that resides in ROM memory inside the on-board microcomputer of the printer. An actual interpreted computer language (as opposed to a set of numeric control codes), Postscript was designed to offer the graphic arts industry an interface between applications software and high quality output devices—a kind of common ground for printers.

Because of the extraordinary power of these new systems, desktop publishing will, within the next few years, become as important to the future of personal computers as spreadsheets and word processors are today.

Postscript can accurately place a character of any size on a page, shade the text in dot-pattern grey scales, set type along any arbitrary (not necessarily straightline) path, draw lines and shapes, fill hollow shapes with patterns, accommodate digitized photographs and other graphics, and rotate and scale (make larger or smaller) any graphic element including type, artwork, or the entire page itself.

In addition, Postscript handles individual fonts—or styles of type—by cleverly describing each character as a set of points and mathematically-derived curves drawn from point-to-point. It converts these descriptions *on the fly* into bit-mapped images within the memory of the printer. This requires only one description of the font to be stored in the printer, then altered by the language to the desired size (from tiny "agate" type to large headline size) and style (plain type, italics, boldface, bold italics, outline, and shadow).

The Postscript language is the creation of Dr. John E. Warnock, formerly a principal scientist at Xerox PARC (Palo Alto Research Center) and the computer graphics firm Evans and Sutherland, and Dr. Charles Geschke. Their company, Adobe Systems, licenses the language to printer and typesetter manufacturers and customizes it for their machines. Adobe also publishes fonts (in addition to the Symbol, Helvetica, Times, and Courier fonts furnished with the language) and translation utilities to use Postscript with operating systems like Unix and with Donald Knuth's landmark typesetting software, Tex (pronounced "tech").

One of Adobe's major strengths is that it has licensed genuine versions of the most important type fonts for use with Postscript. These include the classic Mergenthaler library and modern fonts from International Typeface Corporation, giving publishers and art directors the ability to use clean, proven typefaces for their work. Additional fonts are downloaded from the host computer into a Postscript printer. Screen fonts (different from the printer fonts) with a video resolution of only 72 dots per inch are also available from Adobe.

The Postscript laser printers are furnished with two Mergenthaler fonts, Times and Helvetica. As other fonts become available, they will be downloaded from a personal computer into the laser printer, and corresponding screen fonts will be used as video equivalents in applications such as word and page processing.

The availability of genuine typefaces is of primary importance in publishing because typefaces cannot be copyrighted. As a result, lower quality imitations have appeared on laser printers and typesetters. There is, however, often a world of difference between the faces to which readers have become accustomed and the imitations.

Beside Apple, which uses Postscript as the control language for its LaserWriter, QMS Incorporated, Data Products and Allied Corporation, manufacturer of the Mergenthaler Linotron laser typesetters have also licensed the language. Because Postscript already contains the necessary commands to handle color, it is also expected to play an important role when full-color high quality printers make their appearance.

The beauty of Postscript is that it provides software authors reliable ground

on which to build desktop publishing applications. Software that supports the language generates actual Postscript programs understandable by a variety of printers. When this software is transported from one type of computer to another, the output remains the same. All of this is especially important in what have come to be known as what-you-see-is-what-you-get programs.

Because all of the Postscript-based raster printers share a common language, it is possible to produce the same documents at various printed resolutions without altering the text and graphics data. For example, material prepared on an LCD shutter printer can later be printed via a laser printer or, if necessary, a Postscript-compatible typesetting machine like Allied's Linotronic 300P. (While laser printers are almost certain to begin appearing in more small offices and even homes—their prices will drop sharply—laser typesetters will probably remain a major capital investment of $40,000 or more.)

The first common use of this term came with the popularity of *WordStar*, the CP/M word processing program. Since *WordStar* displayed 80-columns of text on the video screen, it became possible to preview the way a typewritten document would look on paper, where page breaks would occur, etc.

Typewriters and daisywheel printers primarily use *monospaced* fonts. That is, each character takes up the same space on a line. Most computer video displays are also monospaced. This way, we get neat, even rows and columns on the screen. Real type is *proportionally spaced*. Each character has its own width. (Some typewriters use proportionally spaced fonts, although the number of different character widths is much more limited than in typesetting. As a result, it is fairly easy to spot the differences between proportional typewriter output and typesetting.)

Word processors like *WordStar* cannot let you see exactly what you will get using proportional spacing, fonts of different styles (italic, boldface, etc.) or sizes, nor can they display multiple column page layouts or graphics. In short, word processors are not page processors or even typesetting systems. They perform only the minimum requirements for moving text from inside the computer to the printed page.

Mac Changes Things

When the Apple Macintosh made its appearance, however, it used a fully bit-mapped screen. Instead of each character occupying its own, regularly-sized pigeonhole on the screen, the Macintosh allowed programs to access a variety of fonts, styles, and sizes because it treated everything, including text, as graphics. Other computers can, of course, perform this same feat. New, lower cost machines like the Amiga and Atari ST can use fully bit-mapped text screens. And Digital Research's GEM operating system does the same for the IBM PC and its compatibles.

At this time, however, the action in desktop publishing is almost entirely in the Macintosh camp. This does not mean that it is the machine best-suited for the task. It means only that it is more mature in its approach to handling text and graphics together. In fact, the Macintosh is, at present, hampered primarily by its small screen size, its lack of a standard hard disk, and some sluggishness when complex screen computation is required. Nonetheless, the bulk of Macintosh software makes up the strongest support to date for Postscript.

With improved software control, laser printer typography can serve the needs of most users of conventional typesetting.

The Apple Imagewriter, a dot matrix printer, was the only printer the Macintosh officially supported for over a year after the introduction of the computer. It translates bit-mapped graphic screen images to paper from programs like *MacPaint*, and uses double-resolution versions of screen fonts such as Geneva (Apple's Helvetica-like font), Monaco, and New York (a Times-like font). In other words, to print 12-point sized Geneva on paper, the Imagewriter uses a 50% reduction of the 24-point video screen font.

Because Postscript creates its own fonts and graphics within a printer, translating information from the video screen to the LaserWriter printer is accomplished somewhat differently. Instead of printing from the screen image, the Macintosh creates an on-screen, *visual metaphor* for what will happen inside the LaserWriter (or any Postscript printer or typesetter). Screen fonts are used only to approximate the printed text; video graphics offer a visualization of where a line, circle or box will appear on the page. Using Apple's LaserWriter software, the Macintosh then creates a Postscript program that tells the laser printer what to print and where to position it on the page.

Even though the pages that result from programs like *MacWrite*, the Macintosh word processor, and *MacDraw*, an object-oriented graphics program, are impressive when used with a Postscript printer, they are not suitable for the demands of publishing. Here's why.

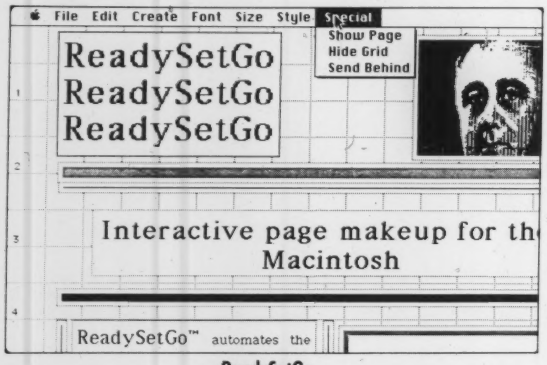
All About Printing

Printing and publishing are centuries-old industries whose art has evolved to its present state with only a few "revolutions." The first of these was, of course, Gutenberg's introduction of movable type. Another was Mergenthaler's invention of the Linotype, which cast type in hot metal, line by line and virtually eliminated the need for manual typesetting. Finally, so-called "hot" type was all but replaced by modern typesetting machines that photographically created the image of type. This is often called "cold" type.

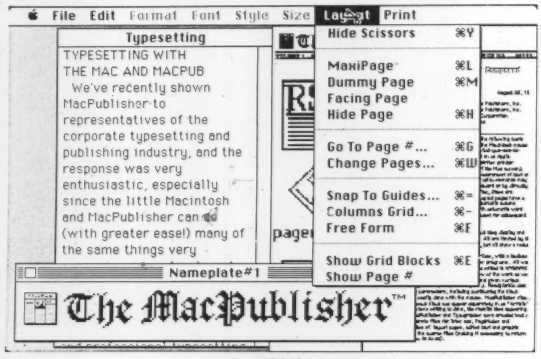
Even though today's standard is photographic type printed by photolithography—a far cry from the days of Gutenberg—little has changed in the method and terminology of printing and publishing. Type, for example, is still sized in *points*, measurements of 1/72 of an inch. Line lengths are measured in *picas*, units of 1/6 of an inch. (There are 12 points to the pica.)

The spacing between characters is called *kerning*. Type can be *manually kerned* to eliminate less aesthetic white spaces, or can be *pairwise kerned* according to traditional practices. The most vivid example of pairwise kerning is the way that the T and the w are often kerned when the word Two is printed. The w is moved closer to the stem and under the overhang of the T so that it becomes easier to read.

When lines of type are *justified*—both left and right edges align vertically with the other lines of type—the kerning is sometimes adjusted, as is the interword spacing. If too much white space appears, a word at the end of the line is *hyphenated* to adjust for this. The space between lines of type is known as *leading* (pronounced "ledding"), a holdover from the days when a thin slice of lead was inserted to increase the space between lines. Usually, leading is one point greater than the size of the type. For instance, the 9-point type in which this article is set, is set with 10-point leading. This is called "nine on



ReadySetGo



MacPublisher

ten'' in printer's parlance.

When a column of type is set ''left justified'' or ''ragged right,'' only the leftmost characters align vertically. When the same type is ''right justified,'' it is ''ragged left.'' The space between columns of type is referred to as a *gutter*, and lines that are placed on the page are *rules*. (A vertical line between columns in the gutter is called a *column rule*.)

Even the way the columns are positioned on the paper is important. If you look at any book or magazine, you will notice that the inside margin is wider to accommodate the binding. This offset is called *recto* when it is on the righthand page, *verso* on the left.

And so on, and so on. This quick tour through the terms and considerations of printing and publishing is not meant to be a comprehensive survey. (For more, consult any number of graphic arts handbooks available in bookstores and libraries.) It is only meant to illustrate the differences between word processors and publishing programs like typesetting systems and page processors.

For desktop publishing to be of significant importance in the history of printing and publishing and to be taken seriously by those industries, it must acknowledge all of these considerations and be capable of doing even more than present systems. It is not enough, therefore, for naive computer users to assume a laser-printed page is publishable just because it looks better than the output of their daisywheel or dot matrix printers.

ReadySetGo

Two landmark desktop publishing programs for the Macintosh appeared early in 1985. *ReadySetGo* was one of the first page processors. It was developed by Manhattan Graphics, an independent typesetting firm who immediately recognized the potential of the Macintosh. Really more of a simple layout tool than a publication-oriented production system, it proved that graphics and text could share the same printed line, and provided for rules, transfer of text into columns, and the drawing of simple shaded areas and borders.

The upgraded *ReadySetGo 2.0* was released shortly before press time and was used by the *Creative Computing* staff to create the second page of this article. It allows direct access to text files from within the program, features multipage capability with the ability to flow text forward and backward along a chain of linked text boxes, and offers full LaserWriter compatibility. Pictures can be cropped and scaled to different vertical and horizontal proportions (introducing possibly useful distortions). However, *MacPaint* documents can be accessed only through the clipboard, which means shutting down the program and going to *MacPaint* every time pictures which are not already on the clipboard are needed.

MacPublisher

MacPublisher is the program that should be credited with starting the desktop publishing movement. Created by Microcosmos, actually the Bob and Holly Doyle family (inventors of, among other things, Merlin, the electronic toy), and published by Boston Software, it was the first program to use both a dummy page (depicting the space taken up by a graphic or copy block) and a reduced full-page on which copy and pictures could be moved.

In *MacPublisher*, text appears full-size in windows to the left of miniature pages, and a tiny scissors icon is used to move copy blocks onto the page. *MacPublisher* will automatically cut a column of text at the bottom, providing a new window with only the remaining lines. These, then, are moved to a new place on the page or ''jumped'' to another page. Two unique tools are included with the program, a ''Camera'' for sizing and importing *MacPaint* illustrations and a ''Ruler'' that allows measurement of text blocks and graphic elements.

MacPublisher originally brought text into the program only through the clipboard, but a new version (*MacPublisher II*) now allows *MacWrite*, Microsoft *Word*, *MacPaint*, and *MacDraw* files to be opened directly from within it, and converts them to its own unique format. This also means that ''enhanced'' text (with boldface, italics, etc. defined by the word processor) can also be used. The original version of *MacPublisher* did not allow mixing text styles. (*MacPublisher II* does.) Both versions of the program provide for changing line leading, but only *MacPublisher II* allows manual kerning between characters. Other enhancements to the program include enlarged screen pages for accurate placement of text and pictures, and the ability to designate repeating elements (such as logos or chapter titles) that will appear on every page of the publication.

PageMaker

PageMaker, from Aldus Corporation, is likely to be the standard by which other page processors will be compared for many years to come. Extraordinarily well organized and simple to learn, it makes use of the electronic equivalent of real-world graphic tools and processes. With it, master left- and righthand pages are defined with guide rules for columns and offset margins. Pages are automatically numbered, and running headers or

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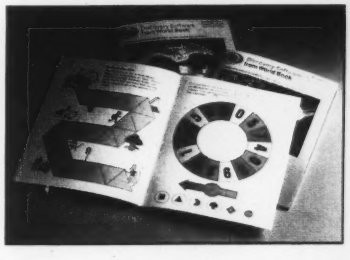

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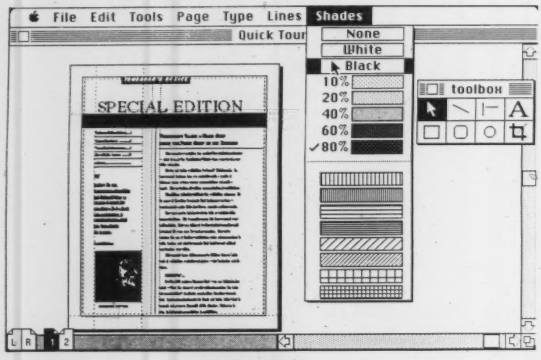
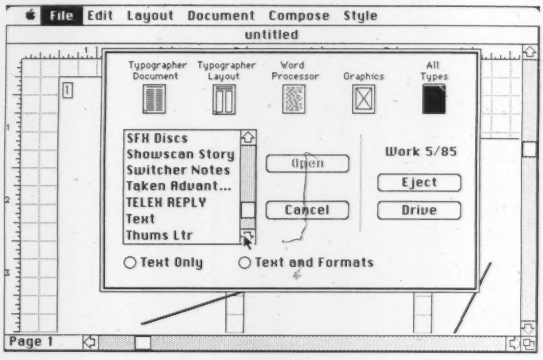


PageMaker



Typographer

footers can be added. (Left- and right-hand pages can have different headers and footers; the title of the book on the left page, for instance, and the chapter title on the right.)

A publication file produced by *PageMaker* can contain up to 16 pages, something of a limitation, but logical in that this number is a standard grouping of printed and bound pages called a *signature*. The *PageMaker*'s standard *PageMaker* page size is 8 1/2 by 11 inches, and the maximum size is a legal sheet, 8 1/2 by 14 inches. Pages can be treated in either the "portrait" (vertical) or "landscape" (horizontal) mode.

Text is "flowed" onto a page by opening a *MacWrite*, Microsoft *Word*, or unformatted text file. *PageMaker* loads a special text-placement icon which can be positioned anywhere on the page. If (non-printing) column guides are present, the text will stay within its bounds and fill the page downward until any other graphic element—text block, shaded region, shape, or illustration—is encountered. When the text flow is stopped, *PageMaker* shows a "tab" attached to the bottom of the copy block with a plus sign, meaning that more text remains. Clicking the mouse pointer on the tab "reloads" the text-placement icon and lets the procedure continue. Graphics are placed on the page in a similar manner.

The program is clever enough to allow changes in the length and placement of copy to be made very easily. When one column of text is shortened, for example, the text in the remainder of columns is automatically adjusted to accommodate the changes. Text can also be *wrapped* around a rectangular shape, by moving column guides and repeating the text-placing process.

PageMaker places heavy emphasis on graphics, and *MacPaint* and *MacDraw* files can be opened directly from within the program. A cropping tool changes the visible portion of a larger graphic or illustration, and pictures can be proportionally resized, enlarged or reduced. Other graphic tools include those for drawing boxes and rules, shaded regions, circles, and ovals. A variety of shades, from white to an 80% black halftone screen can be used as a background for either black or white type. Rules (and boxes) are available in widths from *hairline* (.25 point) to 12 points wide.

In practice, *PageMaker* looks and feels much like *MacDraw*, so novices will probably feel comfortable with the move from word processing to page processing. It also contains some handy features, like the ability to print out a page of "thumbnail" or miniature layouts, for better visualization.

The program is not without its drawbacks, however. First, it is huge—over 240K of program code, not counting another large "help" file—and takes up much disk space. It also requires a 512K Macintosh and an external disk drive. A review copy furnished by Aldus Corporation produced problems with a third-party Macintosh memory upgrade, due to a complicated (and unique) copy protection scheme. Finally, *PageMaker* does not support kerning or hyphenation, although both are promised in a future version.

Typographer

The legitimacy of desktop publishing seems to be proven by the entry of Microsoft into the field with its *Typographer* program for the Macintosh. Written by Broca Software, it is a type-intensive approach to a page processor, not yet released at presstime. This approach comes from its principal author who was, according to a company spokeswoman, the former director of product research for Allied Linotype.

The approach that *Typographer* takes could be the most unfamiliar for first-timers. Good documentation provides background on typographic and printing considerations, although some foreknowledge of graphic arts is probably recommended. (Furthermore, all of the conventions of the Macintosh's "user interface" are not adhered to, and this is likely to throw those who are accustomed to plowing headfirst into a program without carefully reading a manual.)

Typographer makes these sacrifices, however, for the sake of flexibility. Layouts are defined by drawing regions with the mouse, or their dimensions can be entered from the keyboard. (At first, the program looks much like the early *ReadySetGo*.) A "path" for text flow is established by moving pointers between these regions, and the program accepts either plain or enhanced text files from Microsoft *Word* or *MacWrite*. This "free-form" approach to text placement, according to the company, is designed to make it easy to mix column formats on a page. The top of a page can be defined as three columns of text, for example, while the bottom half contains two columns of unequal width.

In addition, *Typographer* pays close attention to the appearance of text in a column. Five settings, from "tight" to "loose," control the interword space (or *spaceband*) widths, and the program will hyphenate words according to a built-in algorithm. (This feature, however, did not work in a pre-release copy.) While *Typographer* itself has few graphic capabilities, Microsoft says a Macintosh desk accessory (the little concurrently-running programs that reside underneath the Ap-

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ple menu bar) called *Art Manager* will offer graphics editing. While neither pairwise nor manual kerning is available at the present time, Microsoft promises pairwise kerning in future versions.

The what-you-see-is-what-you-get features of *Typographer* seem almost only a nod to its Macintosh environment, and it looks as though the program could be moved to the IBM PC with little trouble. While a miniature full page (and facing pages) can be previewed on the screen, work cannot take place directly on these, nor can the screen image be enlarged for greater visual accuracy.

JustText

JustText, from Knowledge Engineering, abandons the what-you-see-is-what-you-get philosophy altogether. It is, essentially, a traditional typesetting front-end for the Macintosh. Since this text editor uses imbedded codes that control the appearance and style of set text, a familiarity with typographic terms is essential.

Bill Bates, the author of *The Computer Cookbook* (Doubleday) and *The Macintosh Cookbook* (Simon and Schuster), drew from his publishing background to create a typesetting system whose results would pass muster with the most critical editors, publishers, and art directors. He used *JustText* and a LaserWriter, in fact, to produce more than 300 mechanicals for his Macintosh book. No other software, he claims, could have done the job.

Indeed, *JustText* is more than a text composition system, it is a bundle of routines Bates has collected or developed over the years and a package of utility programs that demonstrates the power of the Postscript language. As an editor, it translates its imbedded codes to Postscript programs, features full hyphenation (according to the algorithm in Knuth's Tex), wraps text around graphics of irregular shape, and supports manual kerning. A software "filter" can delete carriage returns from text obtained from on-line sources (always a bother), and *JustText* will convert enhanced *MacWrite* documents to text files with the proper embedded codes.

The legitimacy of desktop publishing seems to be proven by the entry of Microsoft into the field.

A utility package, called LaserTools, included with the editor, supplies considerable graphic power. A *MacPaint*-to-Postscript program takes bitmapped images and translates them into rotated and/or scaled Postscript files. A Thunderscan-to-Postscript routine does the same for photographs digitized by Thunderscan, an inexpensive laser diode scanner that works in conjunction with the Imagewriter printer. A third utility, called MacVision-to-Postscript, converts video images to fully-halftoned photo files in 256 shades of grey. (To fill up the disk, Bates throws in two Postscript files that print disk labels and address envelopes.)

Bates feels that, for the time being at least, the plain-vanilla text editor is the only one that can offer complete flexibility and professional results. He claims that what-you-see serves only to limit what-you-get in the available page processors, and, to an extent, he is correct. He also derides the visual page processors (probably somewhat unfairly) as "MacStupid." Still, no one can disparage the text that emerges from a Postscript printer running under *JustText*. It is the closest yet to the quality of real typesetting.

The state of desktop publishing software will improve. After all, it is only in its infancy. Greater accuracy, features like pairwise kerning and sophisticated hyphenation will, with time, appear. Eventually, one page processor or composition system may even approach the ubiquitous status of programs like *WordStar* and *1-2-3*. A new round of technological invention will provide hardware tools that will make it easy (and economical) to enter text from a printed page or digitize photographs and graphics quickly and accurately.

At first glance, it may look as though the desktop publishing movement will greatly benefit the computer industry—the writers of software and the manufacturers of personal computers and printers. This is partially true. The demand for this important capability will create new wealth. But most important, desktop publishing should serve to create greater freedom of the press, introduce new readers to ideas, and reinforce the importance of the written word in the age of electronic communication.

"When in doubt, tell the truth . . ."
—Mark Twain ■

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Manhattan Graphics
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(212) 924-2778

MacPublisher
MacPublisher II
128K and 512K
Macintosh $99
and $149
Boston Software
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Boston, MA 02132
(617) 327-5775

PageMaker
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$495
Aldus Corporation
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Suite 400
Seattle, WA 98104
(206) 441-8666

JustText
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New York, NY 10116
(212) 473-0095

Typographer
128K and 512K
Macintosh $195
Microsoft
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Bellevue, WA 98004
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For information regarding both LaserWriter and Linotronic 300P output of files created with the programs mentioned in this article, contact MacTypeNet, P.O. Box 52188, Livonia, Michigan 48152, (313) 477-2733. Prices begin at $10 per page for 1-50 pages of Linotronic output (at a resolution of 2450 dots per inch.)

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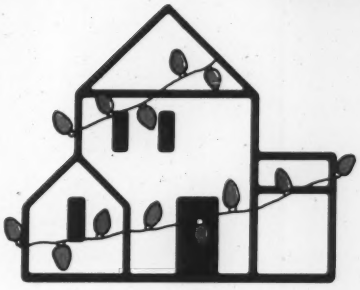

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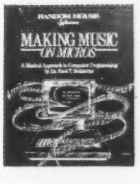
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CIRCLE 122 ON READER SERVICE CARD

Hewlett-Packard Vectra

HP throws its hat into the AT compatible ring/**Joe Desposito**

Like a star athlete who has just ended a long holdout, Hewlett-Packard has finally produced a computer that is IBM compatible. Called the Vectra, it is specifically an AT compatible.

Billed as the "tailorable PC," the Vectra can be customized for different markets. Taking this cue from HP, we configured a system with a 1.2Mb floppy, 20Mb hard disk, 640K RAM, high-resolution color monitor, and touch-screen display. The suggested retail cost of this system is $7279.

The Vectra is one of many AT compatible computers on the market. In our review we attempt to discover what, if anything, makes this one different.

Overview of the Vectra

The Vectra arrived piecemeal, so it gave us an opportunity to assess the difficulty of assembling the parts. Just three screws hold the cabinet to the main unit, and it lifts off easily once they are removed. Installing the hard disk was easy. The Vectra can hold up to three drives, which slide into a metal frame, one atop the other, and snap into place. The disk controller card uses one of the five 16-bit slots available (there are also two 8-bit slots). We inserted a monochrome/graphics card and serial/parallel card to complete the installation.

Vectra

Type: Desktop business computer (IBM PC AT compatible)
CPU: 80286; 8 MHz
RAM: 640K (expandable to 3.64Mb)
Keyboard: Detachable; two sets of functions keys; separate cursor and numeric keypads
Display: 640 x 400 pixels; 8 x 16 text matrix (4 colors)
Disk Drives: 20Mb hard disk; 1.2Mb floppy disk
Ports: RS-232 serial; Centronics parallel
Dimensions: 16.7" x 15.4" x 6.3"
Operating System: MS-DOS 3.1
Documentation: Two system manuals, two DOS manuals
Summary: The Vectra offers a real alternative to the IBM PC AT, but at a premium price
Price: $7279
Manufacturer: Hewlett-Packard
1020 NE Circle Blvd.
Corvallis, OR 97330
(800) 367-4772

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Like the IBM PC AT, the Vectra uses an Intel 80286 microprocessor; unlike the AT, the Vectra processor runs at 8 MHz (compared to 6 MHz for the AT). Memory can be expanded to 640K on a separate processor extension board, which does not use up one of the slots. With additional memory cards, RAM can be expanded to 3.64Mb. A battery-backed clock is standard with the system.

The Vectra footprint is about 30% smaller than that of the AT, and the system weighs about 30% less. The power switch is at the front center of the main unit. An optional security lock can be installed just above the switch.

High Resolution With a Nice Touch

The Hewlett-Packard video adapter card supports both IBM monochrome and graphics modes. The monochrome output is through an RCA jack, which is meant to be connected to an HP high-resolution (640 x 400 pixels) monochrome monitor. The graphics output is through the standard 9-pin DIN connector, which connects to IBM compatible RGB monitors.

The video adapter card also supports high-resolution color graphics when combined with an HP multimode color adapter card. The latter provides RGB outputs for an HP high-resolution (25 MHz) analog monitor. The multimode color adapter card requires a separate slot and connects to the video card with a short cable.

To achieve the high-resolution (640 x 400) color graphics, a scan doubler technique is used. What you see on the monitor is a very impressive color display, smooth not grainy, even if the graphics program you are running uses IBM's 320 x 200 graphics mode. For color text, HP uses its own font, which is created with an 8 x 16 matrix rather than 8 x 8. This font is much more readable than text on an ordinary IBM color display.

The video adapter is similar to the IBM color card in that it supports four colors in the medium resolution (320 x 200) mode and black and white in the true

	Time	Accuracy	Random
Vectra	5.0 seconds	.00585937	7.2
IBM PC AT	9.0 seconds	.01159668	9.3

Ahl's Simple Benchmark Test.

high-resolution (640 x 400) mode.

Either of the Hewlett-Packard monitors can be fitted with a touch screen. Removing the old frame and inserting the touch screen is not complicated, but it is somewhat tricky. Once installed, the keyboard cable is routed to a connector at the back of the monitor, and then to the main unit. Thus, keyboard commands can be issued by just touching an appropriate place on the screen display.

One further feature of the monitor is its ergonomic design. It has a swivel base, and the screen can be tilted.

Not Just Another Pretty Keyboard

The Vectra keyboard duplicates the AT keyboard, but adds some features. A separate cursor keypad has been inserted between the typewriter and numeric keypads. Along the top of the keyboard are eight function keys that are used with HP's proprietary Program Applications Manager software.

The keyboard itself has a much different feel than that of an IBM keyboard. There seems to be less "travel" with each key press. And there is no aural feedback corresponding to the IBM PC keyboard click.

Mass Storage in All Variations

As mentioned, the Vectra configuration we reviewed included a 1.2Mb floppy drive and 20Mb hard drive. Hewlett-Packard also markets 360K floppy, 40Mb hard, and dual 3.5" 710K (stand-alone) drives. The 3.5" drives are of most importance to users of the HP 150 who want to transfer data files to the Vectra. One other type of mass storage device that can be purchased from HP is a .25" tape back-up system (up to 60Mb).

The 20Mb drive that we tested is not one of the high-performance drives that IBM recommends for use with the AT. A Hewlett-Packard spokesperson said that HP enhancements to the disk controller software give the Vectra drive performance similar to that of an AT. One of the failings of the drive, however, is that it does not automatically park its heads upon power down. Thus, a special software "head parking" routine must be invoked whenever the hard disk drive is to be moved.

Two HP Acronyms: PAM and HP-IL

The Vectra runs under MS-DOS 3.1, but HP adds an overlay to the operating system called the Personal Applications Manager (PAM). Using either the special keyboard function keys or the touch screen accessory, you can run applications from a menu that appears on the screen. Adding applications to PAM is relatively simple: you choose the application from a list and enter the path name. If your particular application is not on the list, you just type it in. If you prefer to work in DOS, you can easily disable PAM.

HP-IL (Hewlett-Packard Interface Link) allows PAM to work with the touch screen. HP-IL is no stranger to old HP customers—the interface has been an HP standard for a long time. They keyboard has two HP-IL sockets, the monitor has two, and the main unit has one. Each device is daisychained to the next. The coiled cable from the keyboard plugs into the monitor, and another coiled cable runs from the monitor to the main unit. If you had a mouse, it would plug into the other keyboard socket.

Performance and Compatibility

The keys to performance on the Vectra are the clock rate of the microprocessor and the access time of the hard disk drive. The clock speed of 8 MHz is more than 30% faster than that of the AT. On the other hand, the access time of the hard disk is about half as fast as that of the drive recommended for the AT.

Whether or not the differences in these speeds are critical for you depends on your application. If your work is memory intensive, the faster clock speed will benefit you (see the Ahl Benchmark). If your work is disk intensive, then the slower access time of the drive may be a disadvantage. However, as mentioned, HP has tried to compensate for the slower access time with software improvements in the disk controller.

As for compatibility, the Vectra has been rated as "operationally compatible" by a major research firm. Operationally compatible means that hardware and software that work with the IBM PC AT will work with the Vectra. We used Lotus *1-2-3* and *Xywrite* with the Vectra and also tested a few graphics packages.

We found one problem. When using *The Art Studio* from Spectrum Holobyte, the keyboard was disabled after booting the program. I suggest you try the programs you intend to use with the Vectra to determine whether or not they will run.

Documentation

Two manuals are packaged with the Vectra, and two more are packaged with the DOS. All manuals are clear and well illustrated; however, they lack significant technical information. If you need this type of information, you will have to purchase it separately.

Expanding Vectra's Horizons

How does the Vectra fit into the total office automation picture? Very nicely. If you want to connect to a local area network there is HP's new OfficsShare LAN. This networks Vectras with HP Touchscreens, IBM PC/XT/AT computers, and compatibles. You can also connect to several HP minicomputers.

If you want to communicate with a portable computer, there is the portable desktop link for the HP Portable Plus.

Comments and Conclusions

The main strength of the Vectra lies in Hewlett-Packard's commitment to supporting it with an entire line of add-on boards and peripherals, from those directly associated with the Vectra to other important peripherals like the LaserJet printer.

There is no question that you can buy an AT compatible system from HP that will sparkle. For many applications it will even outperform the AT. HP has addressed critical areas like ergonomics and provided creative solutions like the high-resolution tilt/swivel monitor and the touchscreen.

But I think the question of value must be considered here. A look at comparably equipped 20Mb color systems shows the Vectra priced $60 higher than an AT—before IBM announced its plan to cut prices. But the problem is more than a $60 price difference. Why should you pay top dollar for both systems when the Vectra includes low-performance hard disk drive? I don't think HP is passing the savings on to the customer here.

So if you want a system that you can purchase complete from one reputable manufacturer, the Vectra is a good choice. However, if you are a more cost conscious and adventuresome sort, you may want to tailor your PC from less expensive components. ■

PRINT ABOUT PRINTERS

Gifts to give your printer/**Owen Linzmayer**

With the holiday season upon us, this month we examine some nifty printer accessories—those perfect stocking stuffers that make you wonder how you ever got along without them.

StyleWriter

One of the most exciting products to cross my desk recently is the $169 StyleWriter from Carolina Engineering Labs (CEL for short). Approximately the size of a Hayes external modem, the StyleWriter gives ordinary dot matrix printers the power to produce near letter quality text in a variety of type styles and fonts without any special software.

The StyleWriter, much like a print buffer, is placed in series between computer and printer (in fact, the StyleWriter has a built-in 8K buffer). There are several different versions of the basic StyleWriter module; the unit I evaluated works with Epson FX-compatible printers and any computer with a parallel interface. The StyleWriter can also be had for Okidata and 24-pin printers, and a serial version is in the works.

Three switches, marked PWR (power), RST (reset), and NLQ (near letter quality), adorn the front of the SkyWriter. While the functions of the first two switches are self-explanatory, the role of the NLQ button needs elaboration. When the NLQ switch is not depressed, the StyleWriter is in "invisible" mode. Anything that is sent to the printer passes through the StyleWriter buffer without modification. If the NLQ mode is engaged, the internal 8085 CPU chip converts the incoming ASCII text into near letter quality characters and sends this information to your printer. All of the work is done by the StyleWriter firmware which cleverly drives the printer in graphics mode to produce beautiful NLQ characters that rival the output of all but the best 24-pin printers.

Each StyleWriter ships with two resident 10 point fonts: Roman and sans serif. CEL has a wealth of additional font chips in a variety of point sizes that can be purchased for $19.95 each—these include courier, prestige elite, formal, old English, italic, Greek, Hebrew, and math symbols. President Mark Tofano explains that with their optical character reader and ROM burner, CEL can make custom character sets if you provide them with print samples (prices vary).

CEL StyleWriter and print sample.

The StyleWriter can be equipped with up to six different font chips, and through simple commands you can choose which style to print. The StyleWriter can also be programmed for boldface, centering, highlighting, justification, margins and tabs, inverse, and single or double underlining.

A word of caution before you run out and buy a StyleWriter: it is slow. Very slow. To print such well formed NLQ text, the StyleWriter composes the characters with three passes of the printhead (this is not the case with the StyleWriter designed for 24-pin printers). To minimize delay, simple print only your final copy in NLQ mode; bypass the StyleWriter when you need a draft copy.

By the time you read this, CEL will have announced the $199 StyleWriter II, which comes with a 64K print buffer that is user-expandable to 128K. Anyone who has ever enjoyed the convenience of a print buffer will be hard pressed to do without it; zap a lengthy document off to the buffer and go about your work while the printer dutifully churns out hardcopy. I was always an ardent proponent of print buffers, but now the availability of the StyleWriter II, with its massive buffer and NLQ text enhancements, has turned me into a fanatic.

Finger Print

If the StyleWriter sounds great, but costs a bit more than you want to spend, consider Finger Print from Dresselhaus Computer Products. Finger Print is a replacement ROM chip set for the Epson FX-80 line that gives your printer the ability to emulate IBM and Apple printers, as well as produce near letter quality text at 32 cps. All this for $79.95 retail.

A three chip set, the Finger Print LetterWriter version requires you to dismantle your Epson. After you have slapped the new chips in, you may have to cut a jumper wire, depending on the revision of your printer. Dresselhaus assures me that this installation does not void your printer warranty.

Once the chips are installed, DIP switches must be set to determine the default status of your printer. If you choose to emulate an IBM Graphics Printer, italics will be replaced by the special IBM character set. Alternatively, you may wish to emulate an Apple Dot Matrix printer, though your Epson must be equipped with a serial interface if you want to drive the printer with a Mac or IIc using such popular programs as *MacPaint* or *The Print Shop*.

Even if you don't own an Apple or IBM, you can still make good use of Finger Print—most notably the LetterWriter mode. For all those applications in which near letter quality text is desirable, the LetterWriter mode is a valuable enhance-

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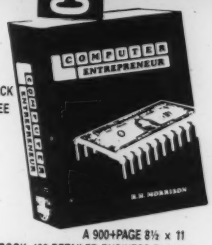

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For those important
documents, wouldn't
you rather have this?

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Finger Print LetterWriter version for FX printers.

ment. The LetterWriter mode can be entered via software escape sequences, or directly from the buttons on the Epson control panel; similar to the FX-85. Operating in this mode, your Epson can print 32 NLQ characters per second using two passes of the printhead. This NLQ mode has four times the resolution of the Epson draft mode.

In addition to near letter quality, Finger Print offers 15 enhancements, including proportional, condensed, elite, expanded, emphasized, double-strike, italic, underlined, and fine print modes. These functions can be engaged in hundreds of combinations through various series of button presses on the printer control panel. Although selecting the modes can be tedious, they remain in effect until the printer is reset or turned off.

If you have been thinking about upgrading your Epson, the Finger Print LetterWriter version may be the best gift you could buy for your computer system. Finger Print is also available for the Epson RX series, though this $59.95 version supports neither Apple nor IBM emulation.

ColorShop

If you read the September installment of this column, you will recall that one reason color printers haven't gained widespread popularity is that few programs currently support this growing group of printers. IBM PC users can take heart; *ColorShop* is here, and it is all you need to put a rainbow on paper.

ColorShop is a utility program that becomes part of your operating system (PC DOS 2.XX) and allows you to print color screen dumps from within most existing commercial software. Occupying less than 10K of RAM, *ColorShop* hides in the background until invoked by pressing SHIFT PRTSC. Then, the *Color Shop* menu pops up, and you can customize the system parameters for the printout you want.

Seven parameters can be adjusted, allowing you complete control over the resulting screen dump. Background lets you choose any one of eight colors as the background default. Palette chooses which of four color palettes will be used in the final printout. Size lets you shrink the picture, and Position determines where it will appear on paper. If you like, you may choose to invert black and white for emphasis. Hardcopy produced with dot matrix printers tends to look somewhat washed-out, but this can be fixed by using the double-strike mode for rich color saturation. And finally, you can command *ColorShop* to print a maximum of seven copies one after another.

ColorShop

ColorShop works with any IBM PC or XT compatible with a color graphics adapter and a printer port. The program supports color printers from Axiom, Canon, C. Itoh, Dataproducts, Diablo, Epson, Facit, Hermes, Prism, Quadjet, Seikosha, and Transtar. Some programs, like Lotus *1-2-3*, won't display the *ColorShop* menu, which forces you to fly blind, relying on your knowledge of the simple menu structure. If you always use the same settings, you can append an options string to the program name to set the default parameters.

If you have been delaying the purchase of a color printer for your IBM because you feared you would never be able to take full advantage of it, *ColorShop* has made the wait worthwhile and your excuses obsolete. Don't delay, get *ColorShop* today.

FingerPrint Plus

Not to be confused with the Finger Print ROM chips just discussed, FingerPrint Plus is an expansion board that gives Apple owners the ability to print screen dumps at the press of a button.

Priced at $149, FingerPrint Plus is brought to us by Thirdware Computer Products of Miami, FL. This product resembles a hardware version of *ColorShop*; instead of loading the menu-driven print driver into memory, FingerPrint Plus relies on firmware in ROM. FingerPrint Plus can be installed in any slot in your Apple. After selecting a slot, you must attach the Centronics printer cable (serial and modem cables are available) to the board and then find a convenient location on your Apple case for the self-adhesive FingerPrint button which controls the action.

For all of your standard printing needs, FingerPrint Plus mimics either the Grappler+ or the Apple Super Serial Card, depending on whether you have the parallel or serial version. It is when you want to transfer whatever is on the screen

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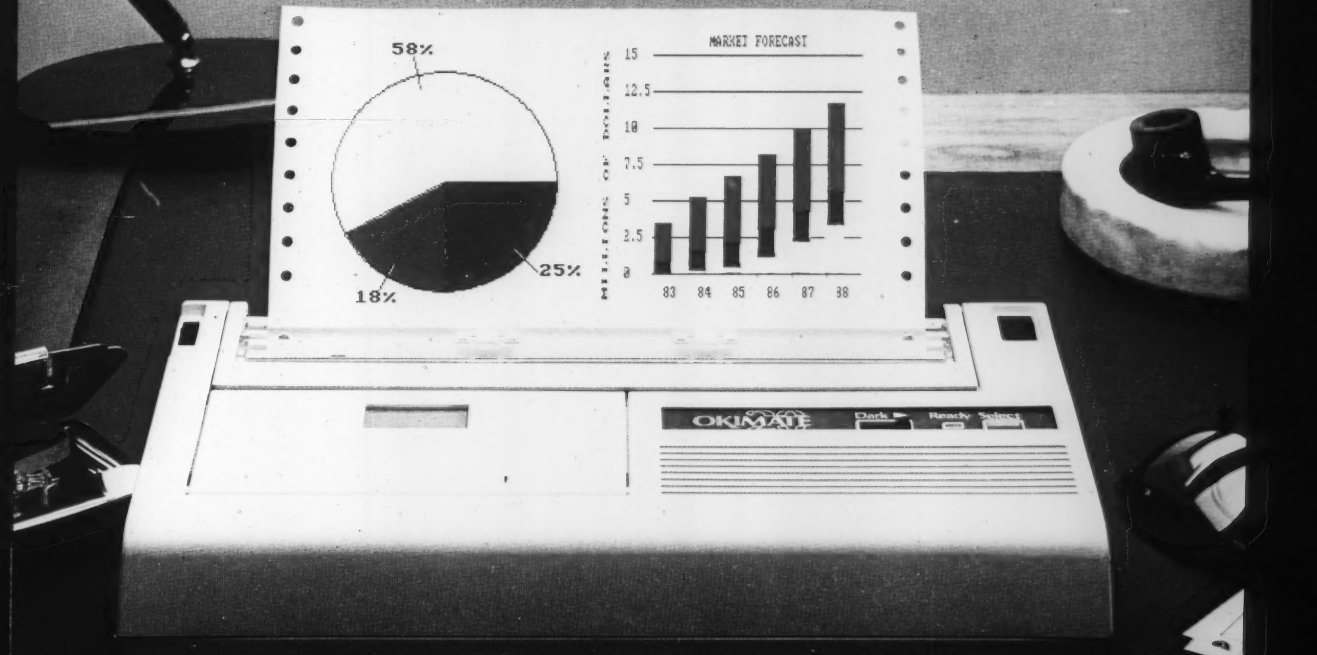

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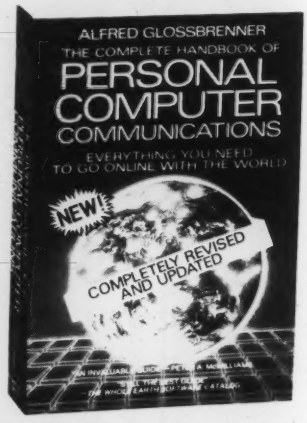

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PRINT ABOUT PRINTERS

to the printer that you begin to appreciate the versatility of this board.

Start by pressing the fingerprint embossed button. This pauses the current program and switches control to the FingerPrint interface firmware. To return to what you were doing, simply press the ESCAPE key. At the simplest level, FingerPrint can be used as a pause function for any program, but it can do so much more.

The FingerPrint Plus menu offers 30 choices. Many of these commands deal with system default settings, and like *ColorShop*, allow you to enlarge, invert, rotate, position, and change the background color of the printed picture. Furthermore, FingerPrint can turn your computer into a typewriter keyboard, sending characters directly to the printer (see last month's review of Epson DX-20). You can also use FingerPrint to jump into the Apple monitor, a particularly useful tool when debugging a problem program.

When you consider that FingerPrint Plus does not cost significantly more than the average printer interface, yet offers an abundance of useful features, it is easy to see why I recommend this product. My one complaint is that the manual needs revision to make it more comprehensible and coherent. All the information for installation and operation is included, but it is obscured by typos and circuitous instructions. Apple IIc owners will be pleased to learn that Thirdware has just announced a similar version of FingerPrint Plus for their machines. ■

Firms Mentioned in this Column

Carolina Engineering Laboratories
818 Tyvola Rd./109
Charlotte, NC 28210
(800) 222-9073
(704) 525-4423
CIRCLE **402** ON READER SERVICE CARD

Dresselhaus Computer Products
837 East Alosta Ave.
Glendora, CA 91740
(818) 914-5831
CIRCLE **403** ON READER SERVICE CARD

ColorShop
11611 San Vincente Blvd.
Los Angeles, CA 90049
(213) 207-4613
CIRCLE **404** ON READER SERVICE CARD

Thirdware Computer Products
4747 N.W. 72nd Ave.
Miami, FL 33166
(305) 592-7522
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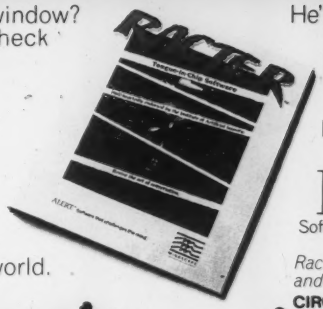

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Sharp CE-515P Color Plotter

Bundled SoftKey software makes this $399 plotter a good value for producing business charts/**David H. Ahl**

The Sharp CE-515P offers accurate four-color plotting at the bargain basement price of $399. The price includes the SoftKey *KeyChart* business graphics software package for the IBM PC or Apple II computers.

The plotter measures a compact 13″ x 6.3″ x 3″ and weighs just over four pounds, not including the hefty external power supply. It handles sheet or roll paper up to 8.5″ wide. Paper is moved along its length by means of small rubber rollers while the pen holder moves back and forth across the paper width on two tracks. The CE-515P handles paper up to the European A4 size (slightly larger than 8.5″ x 11″) and has a plotting area of up to 7.7″ x 10.8″.

The plotter has both parallel and RS-232 serial interfaces built in. The instruction manual has the usual gibberish about RS-232 signal names, levels, and conditions, along with pin configurations for the Sharp PC-1500, PC-5000, and IBM PC computers. Our advice: ignore this section and try the CE-517L cable ($30). We found that it worked fine with the IBM PC and the Tandy Model 100 as well.

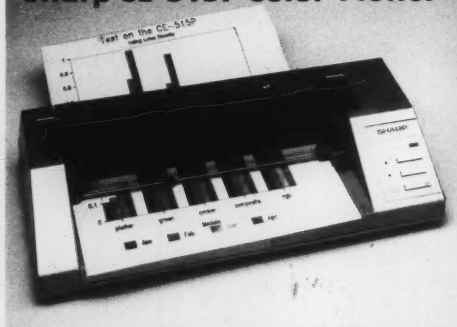
The CE-515P uses ballpoint pens for paper and fiber tip pens for acetate (for overhead projectors). Four colors are available: red, green, blue, and black. Resolution is claimed to be 0.2mm, a figure we verified in our tests. Although this is better than the 0.3mm specs of the Epson HI-80, we found that the actual accuracy of the two units was nearly identical. The plotter has two modes of operation, text and graph. In the text mode, it functions as a printer—a very s-l-o-w printer. However, to add extensive text to a chart it may be easier to use text mode than graph mode.

Graph mode has an extremely rudimentary set of nine single-letter commands, enough to get a plot done, but far fewer than we have seen on any other plotter. All plots are made using steps of 0.2mm (twice as large as most other plotters). Automatic scaling is not built in; this must be done in the program. Unless you like to solve complex puzzles or are familiar with another plotter, the manual is practically useless. I managed to make several plots owing largely to my previous experience with 11 other plotters.

In contrast to the Sharp manual, the 144-page SoftKey *KeyChart* manual is exceptionally clear and full of examples and illustrations. The *KeyChart* software is totally menu driven and even has links to Lotus *1-2-3* and several popular word processing programs. It produces strictly business charts, no mathematical functions, fractals, or fun stuff. However, it offers a wide range of chart formats including bar (normal, clustered, stacked, horizontal), line, pie, X-Y, scatter, and various combinations. It allows on-screen previewing and editing and offers exceptional versatility in the use of text on charts. It is a fine package.

By itself, we would not recommend the CE-515P; the limited command set and inadequate documentation make it just too difficult to use. However, the bundled SoftKey software changes the picture entirely. If you want to do business graphics and hook the plotter to an IBM PC, PC compatible, or Apple II, you won't find a more capable performer for the money than the Sharp CE-515P. ■

Sharp CE-515P Color Plotter



Type: Moving paper plotter
Paper Size: 8.5″ x 11″
Plotting Size: 7.7″ x 10.8″
Resolution: 0.008″
Interfaces: Parallel and serial
Dimensions: 13″ x 6.3″ x 3″
Price: $399
Manufacturer:
Sharp Electronics Corp.
10 Sharp Plaza
Paramus, NJ 07652
(201) 265-5600

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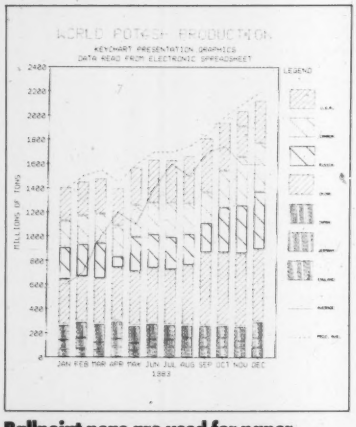
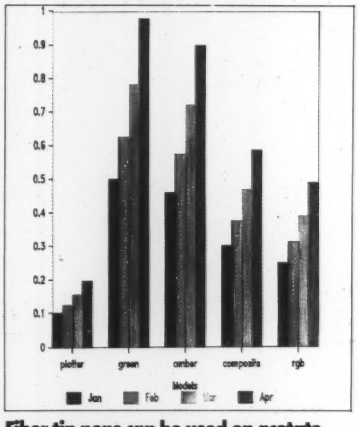


Ballpoint pens are used for paper.



Fiber tip pens can be used on acetate.

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The transportable Bondwell 16 also features a built-in 10 megabyte hard disk drive. Other built-in features include 128K RAM, voice synthesizer, 5¼" floppy disk drive, modem, 9" amber monitor and a complete package of bundled MicroPro software. This little beauty retails for $2,195.00.

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Off the Beaten Track

Peripherals you never knew you needed

Barry Keating

Illustration by Dave Harbaugh

When I was a Cub Scout I used to pore over the back pages of *Boys Life* looking at the ads that always took up the last four or five pages of the magazine. There I could find advertisements for "spy cameras" that cost only 75¢ and even came with a free roll of film; body building programs featuring pictures of Charles Atlas (what ever became of him?); offers for live seahorses and chameleons; and, of course, hundreds of stamps "on approval" from Harris and Garceleon stamp companies.

Most of my information about new products and new software still comes from simply reading the ads in computer enthusiast magazines. Even today though, some of the ads sound incredible; don't you wonder every now and then as you read through an ad: "Can this thing really do all that?"

A couple of ads recently have caught my attention and I just couldn't resist trying the products to see if they performed as advertised. I was pleasantly surprised; with an exception or a misunderstanding here and there, all the products performed as advertised.

Put the Pedal to the Metal

FootMouse is a hardware device that adds a mouse of sorts to an IBM PC—a mouse that you operate with your foot. The $169 FootMouse is a small (4" diameter) plastic pad attached to a sturdy steel base; the device attaches to the IBM through an "electronics box" in the cord between the system unit and keyboard. The box is then connected to the FootMouse with a telephone-like cord.

Then, what do you do with it? The FootMouse emulates the cursor keys. The advantage to using the device is that you can move the cursor without removing your fingers from the "home" keys and so a touch typist can significantly increase his productivity.

To move the cursor, you push your foot forward (about 1/4") for up, pull towards you for down, and so on. The amount of foot movement to control the device is actually quite small; short strokes move the cursor quite evenly.

Can you control the cursor with some degree of precision? The answer is yes; I felt some awkwardness at first, but a little practice made me feel quite at home with FootMouse. It performs its limited function perfectly.

I used the device on an IBM PC. Versatron curiously does not recommend it for other computers. The company advertises the device for other

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computers, including the Macintosh and Apple II, but the only FootMouse we found was for the IBM.

Versatron Corporation, 103 Plaza St., Healdsburg, CA 95448. (800) 443-1550; in CA, (800) 435-1550.

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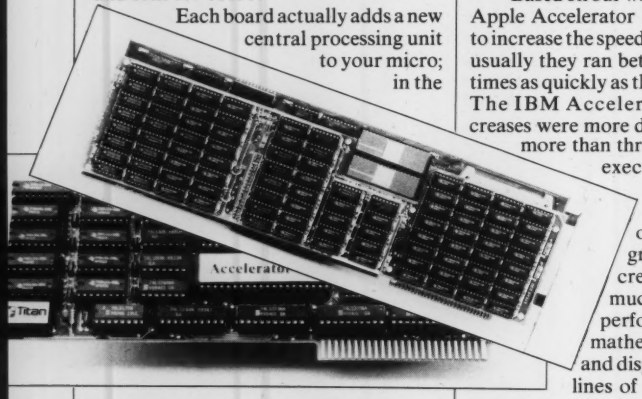
Track Shoes for Your Micro

Titan Technologies advertises add-on boards for IBM PC and Apple II series computers that are touted as increasing the processing speed of the microcomputer by as much as 400%. We tried both boards and found the performance claims to be quite accurate. Accelerator IIe for the Apple sells for $319, Accelerator PC for the IBM includes 640K and sells for $1195.



Each board actually adds a new central processing unit to your micro; in the case of the Apple it is a 6502 like the normal Apple processor, but set to run more quickly and for the IBM PC it is an 8086 16-bit data path processor set to run twice as fast as the normal 8088 processor. The speed-up is accomplished by increasing the frequency of the 6502 or 8086 chip,which allows the computer to process information more quickly. The boards also include memory for the new processor to access (64K in the case of the Accelerator IIe and up to 640K in the case of the Accelerator PC).

Our machines behaved much as they had in the past with the boards installed but with the dramatic improvements in speed suggested by Titan. I noted some minor differences in performance such as the audio prompts for some programs becoming just so many chirps because of the fast machine speed. The Accelerator IIe even uses the extra memory on the Apple 80-column board if the program is normally able to use the extra memory.

In the case of the Apple Accelerator IIe, for software that uses direct memory access and thus is unable to use the accelerator, Titan includes a preboot disk which returns control of your micro to the standard processor and the standard memory bank. This option is quite handy if you wish to run a program without actually speeding it up. Games are probably the most likely candidates for this kind of operation; it is quite difficult, we found, to play *One-On-One Basketball* with the accelerator in operation.

With the IBM Accelerator PC you cannot disable the accelerator, because installing the accelerator involves the actual removal of the 8088 microprocessor. We didn't find any software that was incompatible with the accelerator, so that didn't appear to be a problem.

Based on our wristwatch timing, the Apple Accelerator IIe did indeed seem to increase the speed of all our programs; usually they ran between two and three times as quickly as they would normally. The IBM Accelerator PC speed increases were more dramatic; sometimes more than three times the normal execution speed. Obviously, those programs requiring lots of disk access or graphics did not increase in speed by as much as programs that performed primants mathematical operations and displayed the results as lines of text (e.g. statistical programs, spreadsheets, and *TK! Solver*).

Titan Technologies, Inc., P.O. Box 8050, Ann Arbor, MI 48107. (313) 662-8542.

CIRCLE **408** ON READER SERVICE CARD

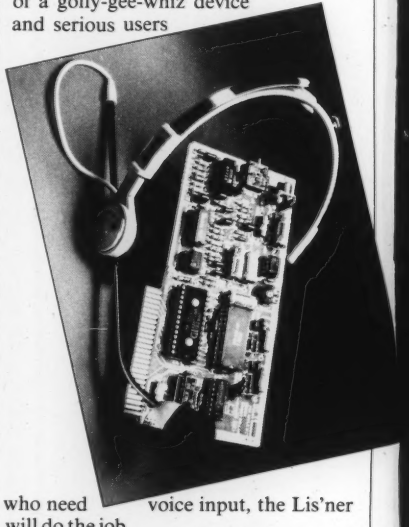
Talk Back to Your Micro

I'm not going to tell you foolproof voice recognition has arrived, but I was happy to discover that a little piece of that dream is now available at a reasonable price. Micromint sells the Lis'ner 1000, an add-on board for the Apple II, which includes a headphone/microphone headset, a disk, and the 79-page manual. The Lis'ner recognizes up to 64 words and accepts each as if it had been typed on the keyboard.

The Lis'ner 1000, which sells for $189, is a "speaker dependent device," because it is trained to recognize only one person's voice at a time. Many different people can train the Lis'ner and store the results of the training on disk, but only one person at a time can normally use the device.

There is one major drawback to the device from the casual user's viewpoint: it cannot be used with most commercially available software. I tried it with packages like *ASCII Express* and *Applewriter* and found that it did not work. Micromint clearly explains why this is true in the manual: "recognition will not work with programs which access the keyboard directly. This includes scanning the address $C000 until a keypress is found." Since many commercial programs use this method of input, the Lis'ner will not work with them. For user-written programs, however, this is not really a problem if you follow the directions in the manual.

I found the recognition accuracy to be virtually flawless and the noise filter easily able to sort out background noises from voice input. For hobbyists in search of a golly-gee-whiz device and serious users who need voice input, the Lis'ner will do the job.



Micromint, 917 Midway, Woodmere, NY 11598. (800) 645-3479. (516) 374-6793.

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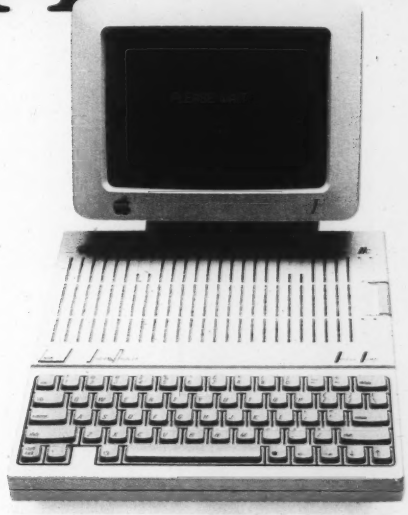
Rent-A-Micro

Libraries have for some time been providing movies, artwork, and videotapes as well as books, but only recently have they begun providing computers to

Let's compare Apples™ to Apples™.



An Apple IIc

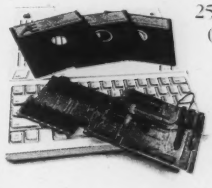
An Apple IIc with Z-RAM

The Apple IIc on the right works exactly the same as the Apple IIc on the left. Almost. The Apple on the right has a powerful memory expansion coprocessing card called Z-RAM. From Applied Engineering. Which means the Apple on the right can completely load AppleWorks into RAM—and then run it up to thirty times faster than the Apple on the left.

Z-RAM also acts as a solid-state disk drive. Which means the Apple on the right will load and store programs up to 30 times faster. And, our included RAM disk is compatible with Applesoft, PRO-DOS, DOS 3.3, PASCAL and CP/M.

Turbo Charged AppleWorks.

Even a 256K Z-RAM can completely load AppleWorks into RAM. With Z-RAM, the moment your fingers touch the keyboard AppleWorks responds. A 256K Z-RAM lets your IIc run AppleWorks up to 30 times faster, increases available desktop to 235K and maximum number of records from 1,350 to over 16,000, doubles the number of lines allowed in the word processor, provides a print spooler, and auto-segments large files so they can be saved on two or more disks. A 512K Z-RAM boosts AppleWorks desktop to an incredible 425K.



Take a closer look.

There's more. Z-RAM has a built-in high speed Z-80B microprocessor that allows you to run CP/M programs. Which means you now have access to the single largest body of software in existence, including popular packages like WordStar, dBase II, Turbo PASCAL and Microsoft BASIC. A 16 bit option is also available.

And still more. Z-RAM is compatible with all IIc software and hardware, installs easily in just ten minutes with a screwdriver (slightly longer without), is available with 256K or 512K of additional memory (a 256K Z-RAM can be upgraded to 512K at any time). Z-RAM is easily handled by the IIc power supply with our patent pending power saving design.

The only thing better than that would be a recommendation from Steve Wozniak.

> ***"I recommend Applied Engineering products wholeheartedly." (Of course, Steve's IIc has a Z-RAM installed.)***
>
> *Steve Wozniak, the creator of Apple Computer*

For fast response.

Z-RAM comes complete with simple instructions, RAM disk software, Z-80 operating system, CP/M manual. And a five year "hassle free" warranty. Make a good Apple great. With 256K Z-RAM "384K total" ($359); with 512K "640K total" ($419); 16 bit option may be added later ($89).

If you want to run CP/M software, but don't need more memory, we suggest our Z-80c card. The Z-80c has no memory expansion ports and is priced at only $159.

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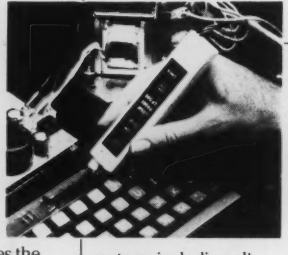

NRI is the only home study school that trains you as you assemble a top-brand micro-computer. After building your own logic probe, you'll assemble the "intelligent" keyboard...

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As you build the Sanyo from the keyboard up, you'll perform demonstrations and experiments that will give you a total mastery of computer operations and servicing techniques. You'll do programming in BASIC language. You'll prepare interfaces for peripherals such as printers and joysticks. Using utility programs, you'll check out 8088 functioning. NRI's easy step-by-step directions will guide you all the way right into one of today's fastest growing fields as a computer service technician. And the entire system, including all the bundled software and extensive data manuals, is yours to keep as part of your training.

...then install the computer power supply, checking all the circuits and connections with NRI's Digital Multimeter. From there you'll move on to install the disk drive and monitor.

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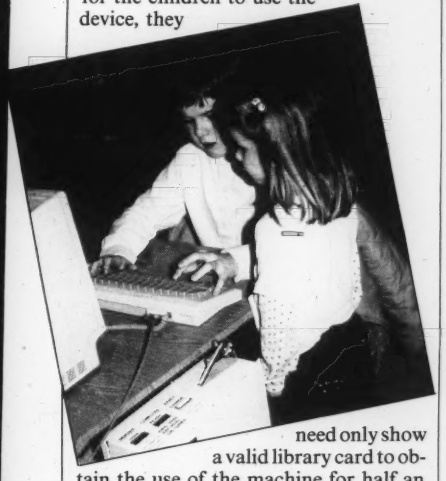
their clientele.

The main public library in South Bend, IN, has two Macintosh computers attached to the same quarter-gobbling devices used to time the rides of children on horses, motorcycles, and helicopters in grocery stores. One of the computers is located smack in the middle of the children's reading room, right in front of the librarian's desk. To make it even cheaper for the children to use the device, they



need only show a valid library card to obtain the use of the machine for half an hour. Their parents, however, must pay 25¢ per 15 minutes of use.

The librarian indicated to us that the machine is rarely without a user, and often there is a queue of young hackers waiting in the wings. There are relatively few programs available (*MacWrite, MacPaint,* and *Sargon III)* but that doesn't seem to deter the children. The most common use seems to be in the preparation of school reports.

The computer is attached to a printer, so that users can get hardcopy of their masterpieces. The only problem so far with the devices seems to be the penchant new users have for "trashing" copies of *MacWrite* and *MacPaint*. Apparently, there is a strong desire in every child to dump things in the Macintosh wastebasket.

Decorate Your Clothes With a PC

No doubt you have seen the ads for printer ribbons (available for the Apple Imagewriter, Okidata, Epson, and Gemini dot matrix printers) that will take any image reproducible on a printer and manufacture a heat-transfer suitable for ironing onto a t-shirt.

Diversions, Inc. produces such a

ribbon (called Underware) for a variety of printers and also supplies a set of felt tipped pens (at extra cost) that allow you to add color to your creations. We tried manufacturing a logo for a t-shirt to be used as an award for Cub Scouts. As long as you follow the instructions provided, which specify that the cloth *must* be at least 35% polyester, the ribbon works quite well. The transfer looks professional and does not wash out when the shirt is laundered. The ribbon can produce somewhere between 30 and 100 transfers, depending upon the size and density of what you choose to print. Diversions Inc. guarantees that you will get at least 20 transfers per $19.95 ribbon.

You must keep in mind that whatever you print must be reversed for the iron-on part of the process to work correctly. This means you must have a software program that reverses images *from left to right*. For Macintosh users *MacPaint* fills the bill, and for IBM PC users *PC Paint* will do the job. For Apple II users numerous programs will work. For the Atari try *Print Whiz*, and for the Commodore *Doodle* will work. Remember that the software is not included with the ribbon.

Diversions, Inc., 1550 Winding Way, Belmont, CA 94002. (415) 591-0660.

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Executive Cursor Control

So you want to use the numeric keypad on your PC for numbers rather than cursor control. Until recently, your only solution was to get a third-party keyboard with both keypad and cursor keys or a separate numeric keypad. Now Kraft has a nifty answer to the dilemma: a joystick for cursor control.

Executive Cursor Control consists of a disk of software that works with a self-centering joystick. Kraft naturally recommends that you use theirs, a recommendation with which we concur as we have found it to be a very high quality unit.

You simply plug the joystick into the game port adapter on your PC (or compatible) and load the software. It is not copy protected and can be loaded onto your DOS disk or hard disk. During this initial setup, you can define the meaning of each joystick button; we found that PAGE DOWN for the red button and HOME for the black button were good choices for word processing. Lotus users may prefer to use the buttons for macro commands; included on the Executive Cursor Control disk is an extensive file of Lotus macros. We found the macro to copy and move a range of cells very handy.

The software provides two cursor movement speeds depending upon how far the joystick is moved from the center position; upon setup, you can reset the slow speed if you don't like the default speed. If you use *TopView*, the joystick driver becomes an integral part of *TopView* and works just as it does under normal DOS 2.0.

Executive Cursor Control is compatible with *Lotus 1-2-3, Multimate, Easy Writer, Volkswriter, Norton Utilities*, and virtually any program that uses

the standard IBM BIOS read calls. We found it to be a very handy device, particularly with spreadsheets and other jobs that require numeric data entry. With joystick included, the price of Executive Cursor Control is $69.95—certainly kinder to your budget than a replacement keyboard. —*DHA*

Kraft Systems, 450 West California Ave., Vista, CA 92083. Telephone (619) 724-7146. ■

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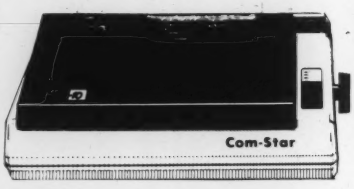

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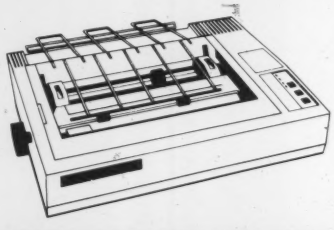

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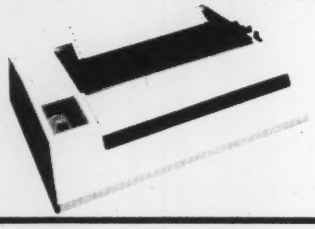

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IBM PC	RGB
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Commodore 64	Composite
Commodore Vic-20	Composite
TI 99/4	Composite
Atari 800	Composite
Atari 1200	Composite
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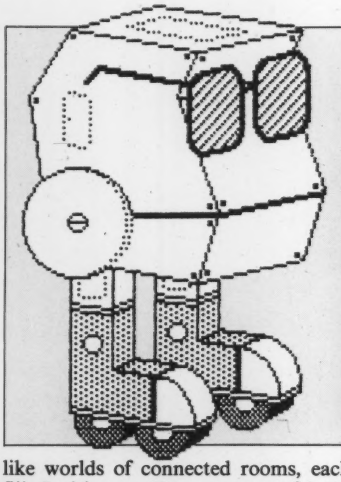
ChipWits

Bet You Can't Build Just One

An engaging robot game that teaches the fundamentals of programming

John J. Anderson



ChipWits

GRAPHICS (+)

PLAYABILITY (+)

CHALLENGE (+)

ADDICTIVENESS (+)

EDUCATIONAL VALUE

System and Price: C64 disk $29.95; Macintosh disk $39.95

Summary: One of the best combination education/entertainment packages of the year

Manufacturer, Macintosh version:
Brainworks, Inc.
24009 Ventura Blvd.
Calabasas, CA 91302
(818) 884-6911
CIRCLE 412 ON READER SERVICE CARD

Commodore version:
Epyx
1043 Kiel Court
Sunnyvale, CA 94089
CIRCLE 413 ON READER SERVICE CARD

It's getting harder and harder to get me to spend any time playing games on a computer—especially the Mac—lately I'd rather knock about exploring, programming, or online. Don't misunderstand: there are plenty of great games to be found. I've just been preoccupied as of late. Now how many of you are tuned in well enough to guess what I'll say next? You got it: I have found a game that has me hooked. It is called *ChipWits*, which is not to be confused with Chipwiches, those delectable cookie and ice cream snacks, or Chiclets, those little buttons of chewing gum used to make lousy computer keyboards, or Nitwits, those people who think that games can't be educational or that education can't be fun.

It is quite rarely, I'll admit, that a game is great fun to play, while imparting truly valuable experiential learning in the process. The last one that had me hooked was *Mule*, from Electronic Arts (reviewed in the December 1983 issue of *Creative Computing*). *Mule* set standards for the educational microcomputer game—it was whimsical, while firmly rooted in sound principles; it was difficult, but offered a steady learning curve; it was fun, but enlightening—not just junk food for the brain. And most important, the more you played it, the more you understood it's subject matter (in that case, principles of a market economy). We were talking not merely about painless learning. We are talking about *pleasurable* learning.

Enter *ChipWits*. Here we have a world of whimsical robots wearing sunglasses and rollerskates. They make funny noises, snap their jaws, even sing a song now and then. They inhabit maze-like worlds of connected rooms, each filled with an odd assortment of junk. Some of the junk is good junk: there are oilcans and diskettes, which are worth treasure points. There are mugs of coffee and slices of pie, which the robots need to provide the nervous energy to make their rounds. Some of the junk is bad junk: there are crabs and bouncers, which can hurt robots and sap their strength. There are even bombs, which blow our little friends to smithereens. Their little world is a lot like ours, really—they must go for the goodies while avoiding death for as long as possible. There is a philosophical message in here somewhere, I think.

So, I had just booted the *ChipWits* disk when my colleague, Master Linzmayer, tossed himself cavalierly into the driver's seat. He picked up the joystick. Our diminutive robot friend, named Greedy, remained stock still. "Hey, how the heck do you get this guy to move?"

Answer: you must program him. That's the object of the game. His brain is in your hands. You must build his brain from the ground up. The better the brain you build, the more successful your ChipWit will be. Owen got up—not his cup of tea. He is a twitch gamer at heart, one of the best. I sat down. Now I'm addicted.

IBOLing It

If you have never written a program in your life, *ChipWits* is the place to start. You can begin to program ChipWits in just a few minutes, and you don't even have to know how to read, because ChipWits make use of a rare hieroglyphic language called IBOL, which stands for Icon Based Operating Language. These instructions tell a given robot how to behave, and are represented as icon "chips," which can be arranged in sets of up to 60 on each of a maximum of eight

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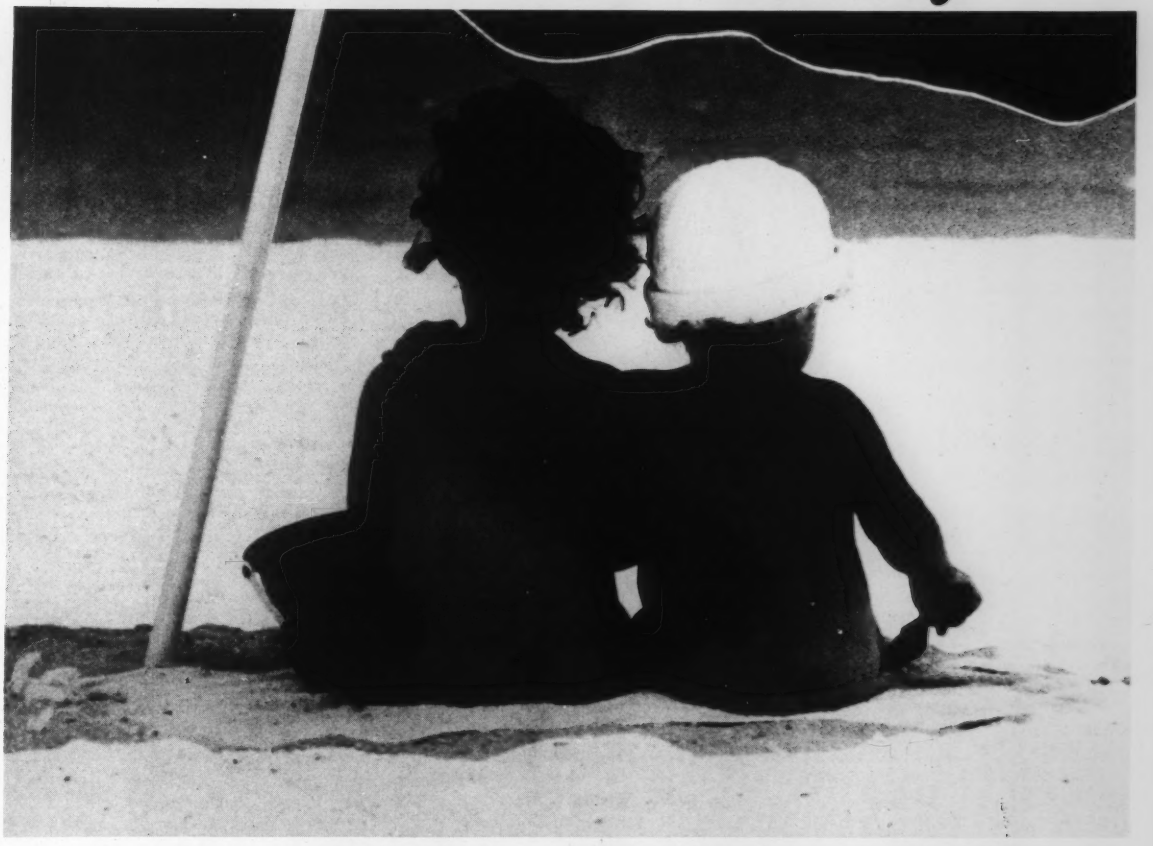

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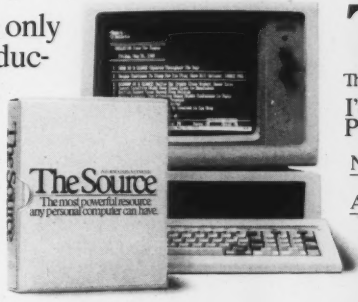

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"circuit board" panels.

Figure 1 is an abbreviated list of operators and arguments in IBOL. They represent the sensory inputs, computations, and action outputs of which ChipWits are capable. From the "workshop" mode, you design the "circuit" using the mouse. When you specify an operator, the possible arguments present themselves as a submenu. By pointing and clicking, you construct a program. That program explicitly specifies what your robot can do on the playing field.

Take a look at Figure 2. It is a diagram of the mind of one of my earliest creations, called Mr. Psycho. He is an exercise in economy as well as violence, running in a mere 13 chips. The philosophy of Mr. Psycho is very straightforward: if the road ahead is clear, take it. Otherwise, vaporize. Hence his name. But Mr. Psycho shows some rudimentary intelligence: he does not bump into things. And that's important. Because a ChipWit's short life, sane or not, is fraught with hazards. Bumping into things damages him, and too much damage leaves him dead in the water.

Form Follows Unction

The single most important educational side effect of the game is that it imparts the urge, and leads the way, to systematic thinking. ChipWits must monitor their energy levels, avoid bumping into walls and bad objects, score points, and navigate. Each mission has a fixed number of command cycles associated with it, and each command costs a certain number of those cycles. So you as robot designer are faced with the task of trading off these component considerations, in the attempt to collect the highest score in a given environment.

The neatest way to systematize a robot brain is to use subpanels. These nest from the main panel (they cannot nest within each other) and allow a modular approach to brain architecture. Figure 3 shows part of a movement subpanel for one of my more recent creations, named Lefty, because he makes only left turns. Figure 4 shows part of a ranging subpanel, which allows Lefty to determine when and where there are goodies ahead, and how to get them. Figure 5 shows the main panel of the latest contender I have wrought, Righty-O. As you can see, his main panel is made up entirely of calls to subpanels. Righty-O makes only right turns, but navigates nicely using the loop shown here as Figure 6.

To make matters all the more interesting, *ChipWits* offers eight different environments within which you can test your creations. Each scenario offers its own peculiarities and its own challenges. You start out in Greedville, which is a simple four room environment with no bad objects. You may work your way to the Mystery Matrix, with 100 rooms of good and bad objects, and finally to Boom Town, where the risk of sudden death looms constantly.

Clear Snailing

All new programs need debugging, and ChipWit panels are no exception. Fortunately, there are a number of debugging tools that really help you find and correct the problems with your ChipWits. While running a mission, a special window alongside the main window traces the program graphically through its execution. By selecting the snail icon (see Figure 7) you can slow program execution to a pace at which the trace can be followed by eye. Alternatively, you may choose the footprint icon, to "step" through each command individually with a press of the mouse button. By using these methods, you can quickly isolate the bugs in your panel or subpanel and correct them in the "workshop" mode.

Last night my wife came downstairs at 4:30 a.m. only to witness me cursing at a cartoon robot. I cleared my throat. . .

Up to 16 different robots can be stored to disk with the names you give them (Greedy and a somewhat advanced fellow named Mr. CW are provided on the program disk as starting points for your own programming).

Chip Nits

Not everything is right with *ChipWits*, and there are several improvements that spring to mind for future versions. Although "editing" the panels works the way it should in a desktop metaphor such as the Mac environment, there is no way to select and move parts of circuits on a single panel. This makes the job of polishing a design much tougher. Sometimes you would simply like to pull a single board apart to insert a few new components. Unfortunately, *ChipWits* is not *MacPaint*. The redesign will entail reconstruction rather than quick alteration.

It would also be nice to be able to step backwards through program execution in the debug window. Many times you see something funny happen, but there is no time to determine just what it was. You may select "snail" mode, but then the phenomenon does not repeat itself for five full minutes. You should be able simply to back up a trace to see what has just occurred, as a good chess program would let you back up through the moves of a game.

There should be an option to create your own environments, as well. This would add to the challenge and the scope of *ChipWits*, and make it possible to create "test tracks," to evaluate the specific skills of your robots.

The documentation could be about five times better.

A Grown Man, Yet

But these criticisms are due only to my burgeoning addiction to the game. Once you get going with it, *ChipWits* becomes obsessive—something that is true of all programming. Last night my wife came downstairs at 4:30 a.m. only to witness me cursing at a cartoon robot. I cleared my throat.

"Righty-O can defend himself, and he gets around pretty well. But he goes really heavy on his cycles, what with those 360° scans he does—32 cycles per pirouette! He's indiscriminate about whether he's picking up food or treasure, and he spends too much time rooting around in nearly empty rooms."

"That's nice. Why do you do this all night when you end up cursing, anyhow?" she asks in a neutral tone.

She just doesn't understand.

We looked at *ChipWits* in two separate incarnations: one from Brainworks for the Macintosh, and another from Epyx for the Commodore 64. We found the versions roughly equivalent. The Commodore 64 version runs in pseudo-Mac form with windows, pull-down menus, and point/click commands. Its desktop interface is well done, and the color and sound will enhance the appeal for youngsters. The Commodore version is deficient in one way, however: it has a bowdlerized debug mode that is much less helpful than the one that appears in the Macintosh version. ■

Figure 1.

OPERATORS

- LOOK
- SMELL
- MOVE
- SING
- FEEL
- GO SUB PANEL
- END LOOP
- LOAD STACK
- ZAP
- FLIP COIN
- GRAB
- JUNCTION
- END SUB PANEL

ARGUMENTS

- BOUNCER (BAD GUY)
- OIL CAN (TREASURE)
- DISKETTE (TREASURE)
- BUG (BAD GUY)
- BOMB (BAD GUY)
- COFFEE (FOOD)
- PIE (FOOD)
- WALL
- FLOOR
- DOOR

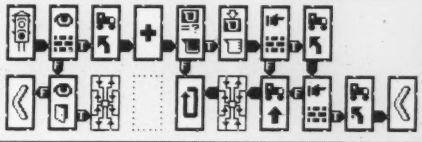


Figure 2. The mind of Mr. Psycho. If it's floor, take a step. If it's a wall, make a left. If it's a door, flip a coin, and either go through the door, or make a left. If it's anything else, kill it.

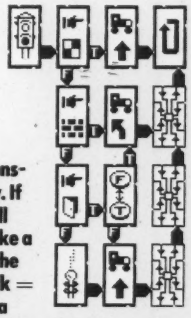


Figure 3. The transmission of Lefty. If you can see wall dead ahead, make a left. Increment the stack. If the stack = 8, you've made a complete pirouette, so clear the stack, and feel for a wall. If you feel a wall, keep turning left. If you have a clear path ahead, take it.

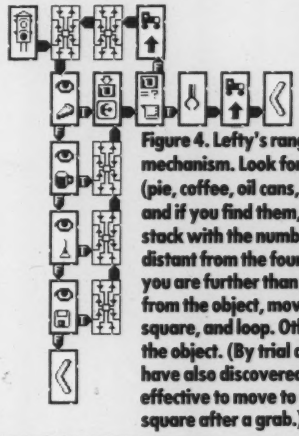


Figure 4. Lefty's ranging mechanism. Look for good things (pie, coffee, oil cans, diskettes) and if you find them, load the stack with the number of squares distant from the found object. If you are further than one square from the object, move ahead one square, and loop. Otherwise grab the object. (By trial and error, I have also discovered it is effective to move to the object square after a grab.)

Figure 5. Main panel of Righty-O consists entirely of subpanels. Subpanel A deals specifically with security (are you threatened by a bad guy?). Subpanel B deals with movement (and is similar to the panel in Figure 3). Subpanel C deals with getting good things (and is similar to the panel in Figure 4).

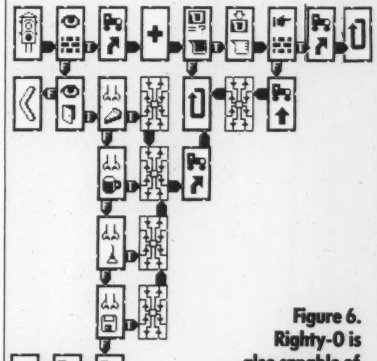


Figure 6. Righty-O is also capable of more sophisticated decision-making than his predecessors. The smell command allows him to choose to leave a room based on whether goodies remain to be claimed there.

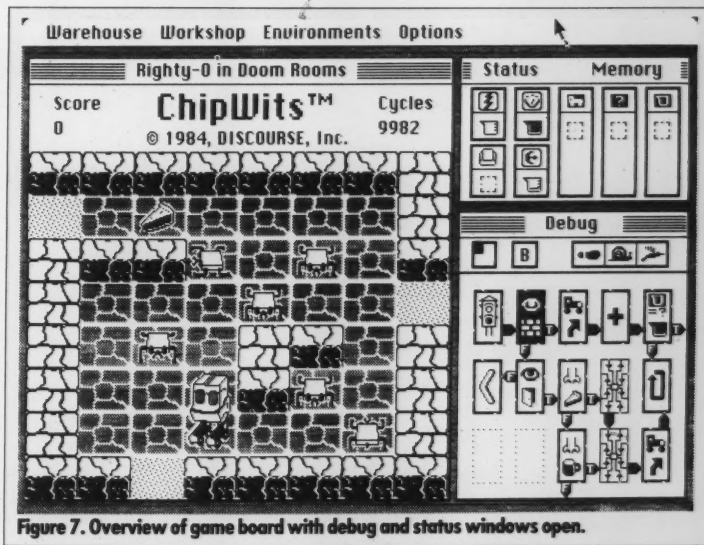


Figure 7. Overview of game board with debug and status windows open.

APPLE CART

New crop in the orchard/**Owen Linzmayer**

This summer while you were on vacation watching Letterman reruns into the wee hours, the elves at Apple were working tirelessly to ensure that this holiday season would be filled with new product surprises for everyone.

When Laura Garske of Regis-McKenna invited me to Cupertino to take a look at these new products, I already had a pretty good idea as to what they were. "Apple," as one third-party developer explains, "leaks like a sieve." The Apple IIe community had been awaiting the introduction of a 3.5" drive and a 1Mb memory board. Mac owners knew a hard disk drive was in the works, and rumors of a color Mac kept creeping into conversations. Now that the veil of conjecture has been lifted, it is time to separate fact from fiction.

I Can See Clearly Now

Of all the new products I saw at Apple, the most impressive was a composite color monitor that deftly displays 80 columns of legible text—a heretofore impossible combination. Until now, if you wanted both color and 80-column text capability, you had to purchase an expensive RGB monitor and interface.

Using proprietary technology, the Apple color monitor can display both rich colors and crisp text by altering its video bandwidth. When the high-resolution text switch on the front control panel is pressed, the bandwidth changes from 3 to 12 MHz, and the monitor enters monochrome mode.

We ran the monitor torture test (see the February 1985 issue for a complete listing of the program) on the Apple color monitor. It passed all of the tests, except that of displaying an inverse box with text—a slight tearing occurred at the bottom of the screen. To test the colors, we booted up a variety of graphics software, including *Dazzledraw*, color printer demos, and several arcade classics. The colors are rich, vibrant, and thoroughly satisfying.

The Apple color monitor features a 13" diagonal screen and is available in two incarnations: a fashionable white unit designed to complement the IIc and a similar model for the IIe. The internal electronics are the same, and it should be stressed that either can be used with any computer that generates an NTSC composite video signal. Priced in the $400-450 range, the Apple color monitor is as expensive as an RGB unit, but because it is composite, there is no need for an expensive RGB interface. I suspect that once word gets out, the market for this product will transcend the Apple community and force other monitor manufacturers to play catch-up for some time to come.

The Apple color monitor can display both rich colors and crisp text by altering its video bandwidth.

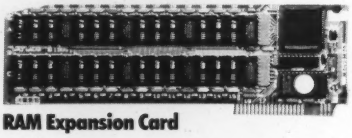
Slow Train Coming

In January I wrote about the next generation Apple machine: the IIx. Recent remarks by Apple's John Sculley coupled with several key product introductions lead me to believe that the Apple IIx project will come to fruition soon. These products are the UniDisk 3.5 and the RAM Expansion Card, both of which provide the perfect segue from the venerable 8-bit Apple II to a more powerful IIx.

The UniDisk 3.5 is a double-sided drive with a formatted capacity of 800K—five times that of the standard Apple II drive. The UniDisk 3.5 requires a unique controller different from the ones used by the Disk II or its replacement, the 5.25" UniDisk. None of these drives can be attached to the same controller, but your II can accommodate all three controller cards with drives connected simultaneously. After getting a free ROM upgrade, Apple IIc owners will be able to use the drive of their choice as the external drive and then daisychain additional drives through either UniDisk. You won't see it coming from Apple, but it's a good bet that someone will offer a UniDisk 3.5 retrofit for the IIc internal drive.

Made by Sony, the UniDisk 3.5 uses the same storage medium as the Mac: a 3.5" disk enclosed in a hard plastic case with a shutter protecting the recording surface. Essentially, the Undisk 3.5 is a double-sided version of the Mac drive, which leads me to believe that Apple will offer a Mac version in the near future. As I examined the $400 UniDisk 3.5, I was prompted to ask "Wouldn't it make more sense to spend $700 and get a Sider 10Mb hard disk?" The answer, as Apple sees it: the UniDisk is inherently more reliable and features removable media.

The RAM Expansion Card is the perfect companion to the high capacity UniDisk. This memory card, unlike Applied Engineering's popular auxillary slot RAMWorks board, operates in any Apple II with slots. The card comes with 256K RAM standard and is expandable to 1Mb in 256K increments.



RAM Expansion Card

Whereas Applied Engineering views RAMWorks as an extension of memory, Apple seems to be pushing their RAM Expansion Card as a RAMdisk. If a ProDOS volume or Pascal 1.3 disk is booted, the RAM Expansion Card automatically formats itself as a RAMdisk with the appropriate operating system. Use of a RAMdisk greatly reduces wait time when saving or loading a file, but you must remember to save the contents of RAM to an actual disk before turning the computer off, or data will be lost. What better place to store your large files than an 800K UniDisk 3.5? Of course, the memory in the RAM Expansion Card can be used as active program memory using bank-switching.

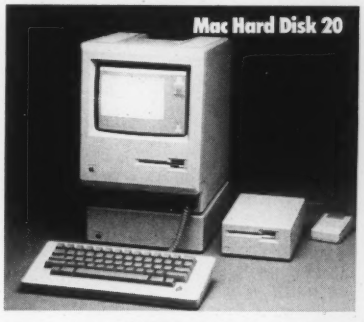
It doesn't require ESP to sense the direction that Apple is taking with these new products. In one fell swoop they have addressed the needs of current owners, while simultaneously paving the way for the introduction of the next generation II machine. As I said in the January column, it is Apple's belief that 3.5" drives will become the industry standard, and they will certainly be used in the IIx, along with the 8/16-bit 65816 CPU created by Western Design Center.

The 65816 provides the software compatibility and memory expandability; the UniDisk 3.5 provides the media compatibility that will prove crucial to the success of the IIx. In the June 24 issue of *The Wall Street Journal*, Delbert Yocam, Apple's executive vice president for product operations, is quoted as saying that "1986 will bring a new version of the Apple II." Apple typically makes major new product announcements at its shareholders meeting which takes place in January. Keep your ears open and your fingers crossed.

Big Mac Attack

Though we must wait patiently for the introduction of the IIx, Mac owners need never again twiddle their thumbs during disk access if they purchase Apple's new Hard Disk 20. With this 20Mb product, Apple has finally acceded to demands for greater and faster on-line storage for the Mac.

Many hard-core Mac fanatics will be surprised to hear that the Hard Disk 20 is an external drive and is not OEMed by General Computer of Cambridge, MA, which markets the popular 10Mb HyperDrive which mounts inside the computer and connects directly to the Mac bus. One popular rumor had it that General Computer was having difficultly meeting consumer demand because Apple had purchased large quantities of the HyperDrive and planned to market it under the Apple logo. This seems not to be the case; "Apple agreed to modify its warranty to allow installation of HyperDrive," explains *The Wall Street Journal*.


Mac Hard Disk 20

Now that you know what the Hard Disk 20 is not, let me tell you what it is. Measuring 3.1" x 9.7" x 10.5", the device is encased in a plastic box designed to be placed underneath the Mac. Much like Mac Bottom, the Hard Disk 20 pleasantly elevates the screen to eye level.

A female DB-19 connector is used to interface the Hard Disk 20 to the external disk drive port on the back of the Mac.

Imagewriter II with sheet feeder.

More than just a sequel, the Imagewriter II can print text or graphics in a maximum of eight colors.

This places certain inherent restrictions on the data transfer speed that are not encountered by the internal HyperDrive. After an initial 15-second warm up, the Hard Disk 20 can transfer up to half a million bits per second through the drive port. Incidentally, the Hard Disk 20 has a port through which you can daisychain additional equipment.

The Hard Disk 20 has a formatted capacity of 20.77Mb utilizing four surfaces with one head each. Blocks are 532 bytes long, 20 of which are reserved for system data. During a brief demonstration, I noticed that the Hard Disk 20 is not as fast as a HyperDrive, but that was to be expected. The annoying thing was that the drive made audible clicking noises during data access. Though admittedly not a big deal, you would hope that for $2000, Apple could produce a hard disk drive that didn't chirp.

Toward Color Mac

In what may be the first concrete piece of evidence that Apple plans to release a color Macintosh, Cupertino recently began shipping the Imagewriter II. More than just a sequel, the Imagewriter II can print text or graphics in a maximum of eight colors. In my opinion, the Imagewriter II with its color printing capability is far superior to its kid brother—so much so that it is difficult to imagine they are even distantly related.

When asked by Apple how many Imagewriters we think are in the field, Technical Editor Joe Desposito replied with a simple question, "How many Macs have you sold?" The Imagewriter is the faithful, if not mandatory, companion to the Mac. After all, since Apple chose to buck the trend and go with a serial printer interface, what other printer could you buy? If you own a Mac, you almost certainly own an Imagewriter as well. Likewise, if you buy a color Mac, you will want hardcopy of your beautiful color *MacPaint* pictures, and the Imagewriter II is the perfect solution. I am convinced that the Imagewriter II is proof positive that Apple is working on a color Mac. Why would anybody want one for a monochrome Mac? (Note: the Imagewriter II works with the Apple II line as well.)

In the September installment of Print About Printers, I discussed several color printing techniques. The Imagewriter II is an impact dot matrix printer that uses a four-color cloth ribbon. By mixing the colors on the ribbon (black, magenta, cyan, and yellow), the Imagewriter II can produce eight different colors and thousands of hues. It is my observation so far that the Imagewriter II does not suffer from problems common to color impact dot matrix printers: poor registration and inconsistent ink application.

The Imagewriter II is an expandable printer. Under its hood is a slot into which you can place either a 32K print buffer or an AppleTalk interface. The buffer costs $150 and supplements the standard 1K buffer. Apple emphasizes that although they supply only these two options, third-party manufacturers are expected to offer a host of others. At 250 cps the Imagewriter II is significantly faster than the original Imagewriter, but most important, the new model features near letter quality text at 25 cps. The lack of an NLQ mode on the Imagewriter is one of its biggest drawbacks, and I am pleased to see that Apple has finally redressed the issue. (Look for an in-depth review of the Imagewriter II in an upcoming issue.)

By introducing these new peripherals, Apple demonstrates its corporate strength and commitment to the installed user base. Denise Trepanier, peripherals marketing manager, stresses that Apple is indeed listening and trying to provide us with the latest technology available. ■

Firms Mentioned in this Column

Apple Computer, Inc.
20525 Mariani Ave.
Cupertino, CA 95014
(408) 996-1010

Sony Communications Products Co.
Park Ridge, NJ 07656
(201) 930-6432

IBM IMAGES

Batch files and new software from IBM/**Will Fastie**

One of the more important, but perhaps underrated, features of the PC-DOS command processor, COMMAND.COM, is the batch file, known by its .BAT file extension. Named because it provides the facility for a group, or "batch," of operations to be performed automatically, the batch feature is really a small programming language based around DOS commands. It is an unsophisticated language if compared to its counterparts in DG's AOS, DEC's VMS, and AT&T's Unix, but it is useful nonetheless.

The simplest application of batch files involves the serial execution of a series of commands. If there is a set of commands that you always execute one after the other, you can build a text file containing them, give it a convenient name (but always with the .BAT extension), and get the whole thing running by mentioning just your new name. Better yet, if that set of commands involves information, such as filenames, that changes from one execution to another, the variable information can be given on the command line and automatically inserted into the actual commands.

As an example, I have a small batch file called MOVE.BAT that can move a whole group of files. The difference between my MOVE and the DOS COPY command is that my command deletes the original files after they have been moved. That makes sense: COPY duplicates files, MOVE simply relocates them. The two-line batch file to perform this minor miracle is

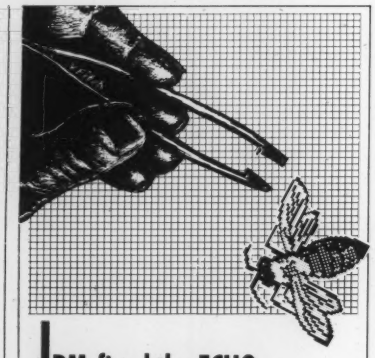
```
COPY %1 %2
DEL %1
```

and a sample command is

```
MOVE a:*.bas b:
```

which relocates all files with the .BAS extension from drive A: to drive B:. MOVE is particularly useful on a hard disk system, especially if a directory structure needs some reorganization.

There are some special and very helpful DOS commands intended for use in batch files. They are referred to as subcommands and are GOTO, IF, FOR, SHIFT, PAUSE, REM, and ECHO. They are explained well in the DOS documentation, and I will not detail them here. IF is perhaps the most important command, because it is the only one that allows alteration of flow, which simply means that you can "program" a batch file to take one of two actions based on a test of some condition. DOS allows a number of conditions, which are also explained in the DOS manual.



IBM fixed the ECHO command to remove a bug of which I had been taking considerable advantage.

For me, the most important subcommands are REM and ECHO. REM should be obvious if you have ever looked at Basic: it simply allows the inclusion of comments in the batch file. Use REM! The value of comments in any programming language is inestimable, and they can help you figure out what you did months or years later.

ECHO is important for two reasons. First, it allows the batch file to "speak" by providing a means for short (one-line) messages to be displayed on the screen. This has obvious value for instructions. Second, it can be used to disable the normal output of COMMAND.COM. Normally, each command is echoed to the display as it is executed. This is useful sometimes, because, if variable arguments are used, the substitution of arguments into actual commands can be seen. For example, my MOVE command above would echo as

```
A>MOVE A:*.BAS B:
A>COPY A:*.BAS B:
A>DEL A:*.BAS
```

with, of course, the dialog from each command showing in between. However, if the command ECHO OFF has been given, only the dialog is shown. This usually represents a significant reduction in screen output and is often desirable. Also, REM subcommands echo as well and can be eliminated. Therefore, ECHO OFF is usually the first command in my batch files, and ECHO ON is usually at the end.

All this leads up to a problem I had with the ECHO command in DOS 3.1—a problem that evolved because IBM fixed the ECHO command to remove a bug of which I had been taking considerable advantage. It turns out that ECHO followed by at least two spaces had the nice effect of printing an empty line (ECHO with one space or nothing on the command line reports whether ECHO is on or off). So I used ECHO-blank-blank to solve a few problems I was having because some programs I use *don't* emit a linefeed when they terminate. DOS is very nice about this: it avoids the problem by always advancing to the next line. For most programs that means a blank line on the screen; a few programmers have written software without the extra line spacing because they know it is coming from DOS. However, it doesn't come during batch file execution. DOS considers a batch file to be a command and generates its normal prompt at the end of the whole set of commands.

In DOS 3.1, ECHO-blank-blank is what it should be: the ECHO command with nothing on the command line. It thus reports the current state of ECHO, either on or off. This led me to a brute force solution: if ECHO wouldn't give me a new line anymore, I would write a small program to do it. The result is NL, which is shown in Listing 1. I created it using the debugger, a simple task because it is so small and because IBM's DEBUG program since version 2.0 has supported the A command for assembly. The listing shown is (mostly) the output from the assembler so that the benefit of commentary could be included.

It is a simple matter to create this program. I have shown the debugger dialog in Listing 2, and it's pretty straightforward.

Programs of this nature can be very helpful in batch files. I wrote (if you can call it that for such a small program) NL out of desperation and very quickly; I should have done a more careful job by allowing a number on the command line and making the program emit that many new lines. Better yet, the program could have been generalized to emit anything. For example, the syntax

```
EMIT 205/79 13 10
```

would display 79 double line characters, followed by a new line, thus drawing a double line across the screen. The com-

```
                        page        55,132
                        title       NL:  Program to emit 1 newline
                    ; Author:       Will Fastie     on 85/09/08 22:05
                    ; O/S:          PC-DOS, any version
                    ; DOS Syntax: NL
                    ;-----------------------------------------------------
                    ; Setup so EXE2BIN can convert program to .COM format
0000                CSEG  segment para public 'CODE'
                          assume  cs:CSEG, ds:CSEG
                    ;
0100                      org     100H
                    ;-----------------------------------------------------
0100  B4 02         GO:   mov     ah,02h  ;write 1 character to screen
0102  B2 0D               mov     dl,0Dh  ; = carriage return
0104  CD 21               int     21h
0106  B4 02               mov     ah,02h  ;write character
0108  B2 0A               mov     dl,0Ah  ; = line feed
010A  CD 21               int     21h
010C  CD 20               int     20h     ;terminate program
                    ;-----------------------------------------------------
010E                CSEG  ends
                          end     GO
```

Listing 1. Assembler listing of NL.ASM.

plexity of a program like this, when considered in assembly language, is somewhat great because of the need to interpret the numbers (or possibly characters) off the command line. It is certainly not the three-minute job of NL. The program could be quickly written in a high level language, but most compilers produce a large executable file (about 10,000 bytes, on average) for even the smallest program. That does not compare well with the 14 bytes of NL.COM, a program that loads and executes in a flash.

I have found several commercial programs that are useful in batch files. A particular favorite of mine is Timemark, one of the programs included with the Norton Utilities. Timemark emits a very civilized-looking time and date stamp to the screen and is nice for a variety of applications. I don't know that you should pay $80 for just that program, but the Norton suite is worth having around anyway. Oh, by the way, it was Timemark that induced me to write NL.

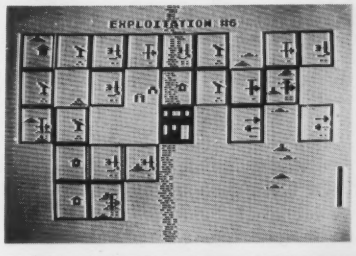
IBM Does it Again

I have never been shy about criticizing IBM, and my opinion of much of their software has been less than outstanding. In one area, however, IBM seems to be hitting the mark. They have struck again, and once more I am impressed.

There are 22 new programs in the Personally Developed Software for IBM Personal Computers series (let's call it PDS), reviewed here previously. As before, the programs seem to have a consistent quality to go along with their uniform packaging and presentation. There are a few flops, a few goodies, and some average but useful programs. Although I can't review 22 programs here, I thought I would mention those about which I feel strongly. There is also a new strategy and some retrenching.

The new strategy is evident with the appearance of three games from outside companies rather than individuals. They are *Alley Cat* from SynSoft, *M.U.L.E.* from Electronic Arts, and *The World's Greatest Baseball Game* from Epyx, Inc. Apparently IBM is using the mail order vehicle to move some games at good

M.U.L.E.




```
-a 100
0D8E:0100  mov ah,02
0D8E:0102  mov dl,0d
0D8E:0104  int 21
0D8E:0106  mov ah,02
0D8E:0108  mov dl,0a
0D8E:010A  int 21
0D8E:010C  int 20
0D8E:010E
-rcx
CX 0000
:e
-nnl.com
-w
Writing 000E bytes
-q
```

Listing 2. DEBUG dialog for NL.COM.

prices (see Table 1) for the PCjr (although all work on the PC and AT as well). I didn't get *Alley Cat* in the review package, but I have tried the other two. *M.U.L.E.* looks interesting, but it is complex and I had too little time to give it a fair shake. Other versions have received rave reviews in *Creative*.

Baseball looks okay; I did like the animation. Both these games depart from the PDS strategy in another way: they have printed manuals instead of disk documentation. Both are copy protected.

The retrenching is *The Combined Adventures With Numbers*, a product that replaces four games in the previous catalog and represents a price improvement of almost $60. I assume that the games, although nice, did not sell well; I think the bundled version should do better. While on this subject, I should mention that IBM does not suggest an age group for the programs in the "Education Family," an omission I consider serious. SRA, where are you?

Flops

There are three programs in the series that I cannot recommend. The first is *Personal Editor II*. At $49.95, it includes many features and supports some word processing techniques, but it is not up to par with the mainstream products. There are several editors at about the $100 mark which are clearly superior; I think the extra money is worth it in this case. If the budget is really tight, this product will do the job, though.

Next is the *Structured Basic Facility*. This is a preprocessor program for Ba-

sic that allows the programmer to use a more structured variant of Basic. Conceptually, this is a good idea; I published just such a program in the first issue of *PC Tech Journal*. However, it costs $54.95. For that money, you can get Turbo Pascal. For less than $100 you can get Microsoft's new QuickBasic compiler which, in addition to allowing structured programming, produces a program running faster than interpreted Basic. *SBF* would be interesting at $19.95; priced as it is, it is a dinosaur.

The final flop is only half so. *PC Print* is a program that prints a variety of fonts in different sizes on either the IBM Graphics Printer or the IBM Color Printer. Its most important feature, however, may be its ability to print sideways! There are several commercial products which do this, but none at the $24.95 price. For that feature alone, the product is a bargain. So why a flop? Because it supports only the IBM printers. It is really the first general purpose utility product in the PDS series to limit its own sales potential by requiring IBM-specific hardware. My tests on my TI 855 showed that a general FX-80 emulation is not enough: *PC Print* does need IBM hardware to do all its act. The sideways printing, however, uses the graphics capability of the Epson, and my printer handled that just fine.

I think IBM goofed on this one. It is a good product, confined to a narrower audience than it should be.

Goodies

Two new products in the "Programming Family" are interesting. The first is *Language Extension System–Assembler*, a $24.95 package that adds 8087 and 80287 instruction capability to version 1.00 of the IBM Macro Assembler. If you already have MASM 1.00 and just need numeric coprocessor capability, this is a bargain. MASM 2.00 is a better way to go, because the instructions are integrated in the language (*LESA* is a set of macros) and because it runs much faster. However, it costs $150. An upgrade from 1.00 to 2.00 was available for $75 but has been discontinued (it always had an expiration date). This product can fill the gap.

The second is *PCWatch*. It is a complicated product to explain in one paragraph, so understand that of the 21 products I had, it was the first I tried. It is a monitor program that grafts itself onto DOS and allows you to watch execution of an arbitrary program. Nothing has to be done to the program, and almost anything can be observed in this way. What is particularly nice about *PCWatch* is that you can select exactly which system functions you wish to monitor. If a program is having trouble with a serial port, for example, you can get *PCWatch* to look at just the relevant interrupts. I also liked the intelligence behind the product. For example, the program can be told to ignore a category called "noise." If this option is selected, a whole group of items is removed from the list and not observed. A lot of thought went into this program; it shows, and the product is worthwhile for serious programmers because of it. There are other such products on the market, but the *PCWatch* price of $49.95 is attractive.

The "Lifestyle Family" has two new entries that I found well conceived and implemented. The lesser of the two, at $19.95, is *PC Checkbook*. All this program does is keep a checkbook ledger, print the ledger, print checks if you have the stock, and help reconcile your checking account. That's it, but that's exactly what I have been using *SuperCalc* for these past few years. This new program is better than a spreadsheet because it is specialized to the task.

Better yet is the $29.95 *Checkbook I/O*. The name is poor; the program is actually a small home finance manager. It maintains transactions for up to five checkbooks and five cashbooks (cash accounts). But it also has many of the sophisticated features of products many

Product	Part No.	Price
Entertainment Family		
Sports Appeal (Sports Trivia)	6276608	$19.95
Trivia 103 (For Young People)	6276610	$19.95
Alley Cat	6276621	$24.95
M.U.L.E.	6276619	$29.95
The World's Greatest Baseball Game	6276620	$24.95
Education Family		
The Combined Adventures With Numbers	6276609	$39.95
PC Morse Code	6276612	$19.95
Productivity Family		
DOS Memories	6276607	$34.95
JoyMouse	6276606	$14.95
Multimedia Presentation Aid	6276611	$24.95
PC Print	6276613	$24.95
Personal Correspondence Manager	6276615	$39.95
Personal Editor II	6276550	$49.95
PrintDW	6276604	$19.95
Programming Family		
Language Extension System-Assembler	6276584	$24.95
PCWatch	6276603	$49.95
Structured Basic Facility	6276618	$54.95
Lifestyle Family		
BridgeBreak 200	6276605	$24.95
Checkbook I/O	6276616	$24.95
PC Checkbook	6276617	$19.95
Business Family		
Programmed Evaluation of Contract Option Strategies	6276614	$249.95
RealEstate Investment Package	6276597	$19.95

Table 1. New releases from Personally Developed Software.

Firms Mentioned in this Column

IBM Corporation
Personally Developed Software
P.O. Box 3280
Wallingford, CT 06494
(800) IBM-PCSW

Peter Norton Computing
2210 Wilshire Blvd.
Santa Monica, CA 90403
(213) 826-8032

Microsoft Corporation
10700 Northrup Way
P.O. Box 97200
Bellevue, WA 98009
(800) 426-9400

times more expensive. For example, a single check can be written and its amount applied to more than one budget account. That is a simple but very important facility that makes the difference between true utility and just another program that consumes more human resources than it saves. *Checkbook I/O* can also print checks and has some impressive features in that area.

One objection to *Checkbook I/O* is that it, too, requires a printer compatible with the IBM Graphics printer. Again, I think IBM and the program designer made a mistake: the program uses the line-drawing characters for its reports. The reports look pretty, but there are far more Epson printers sitting next to IBM PCs than there are IBMs. I can't understand why this mistake was made. Can IBM be that proprietary about its printers?

All things considered, this is another good set of offerings from IBM. After seeing so many overpriced items with the IBM label, it is nice to be able to report good prices, good value, and good utility. I hope they keep it up. Maybe IBM has learned something from Borland. ■

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Disk Operating System
— Scratch Areas
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— Entry Points
— Disk Allocation
— Initialization
— Available Functions
— File Management
— Disk Transfer Areas
High & Low Ram
Rom Bios Routines
Self Testing
Compilers
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CIRCLE 126 ON READER SERVICE CARD

COMMODORE'S PORT

Devices and programs to speed up the 1541 drive/**Dan Rustin**

Ask any Commodore 64 owner what he thinks of his system and lodged somewhere in the reply is bound to be the word "slow."

The culprit is Commodore's 1541 disk drive. This workhorse was designed to address the serial circuitry of the system to make it compatible with older Commodore computers.

Recognizing this, several third-party suppliers have rushed into the breach with an assortment of catalysts to speed up the lumbering 1541. These range from software on disk to plug-in cartridges to hardware modifications which actually replace the ROM chips in the computer and the drive.

We compared four of the more popular speed-booters. Two were cartridges that plug into the port at the right-rear of the Commodore 64: the Epyx FastLoad and the Access Mach 5. Two others were programs on disk: *Kwik-Load* from Datamost, and *Turbo 64* from MegaSoft.

We found that all four were able to speed up loads of most unprotected disks and public domain programs by as much as 500%. As just one dramatic example, load time of the unprotected (dongle-enabled) *Script 64* word processor, which loaded in 1:17 minutes normally, was cut to under 20 seconds by three of the four utilities we tested—a gain of 385%.

Protected disks were a different story. Not one of the enhancers tested had any effect on the loading speed of the more recent version of the same word processor, which is now protected. With or without enhancement, the disk loaded in just under two minutes.

Generally speaking, however, FastLoad and Mach 5 *did* have success in speeding up loads of most commercial games. *Turbo 64* improved the loading time of some programs by a few seconds. But since it takes five seconds to load *Turbo 64*, its time savings were usually negligible. And, as advertised, *Kwik-Load* failed to load most commercially protected software, except in isolated instances. When it came to loading unprotected programs, *Kwik-Load* was easily a match for the competition.

Equally important, none of the speed-booters had any effect on files under program control. In other words, there were no time reductions on loading or saving documents within a word processing program, database, or spreadsheet.

We were able to speed up loads of most unprotected disks and public domain programs by as much as 500%.

These restrictions aside, where the catalysts *did* have an influence on load time, the reductions were significant. FastLoad and Mach 5 cut the load wait on nine randomly selected protected games from an average of 1:09 minutes to 38 seconds, or roughly half. The average for *Turbo* was 56 seconds.

Public domain programs almost always loaded faster, reducing the wait time from an average of 38 seconds to 14 seconds for 11 typical programs by all the loaders except *Turbo*, which averaged 21 seconds.

Saves to disk, even of Basic programs, were not improved, however. Copying unprotected programs, though, was decidedly faster with the two products that include backup programs. The copy utility of *Kwik-Load* was especially fast—a full disk of 664 blocks, which took nearly half an hour using the 1541 Single Drive Backup Program, was duplicated in less than five minutes by *Kwik-Copy*. FastLoad did the job in 10 minutes, or one-third the time of the older duplicating program.

Added Attractions

We found that, aside from the ability to speed up some loads, each of the products we tested offers an extra bonus in the form of a utility that might make it even more attractive to C64 owners. FastLoad, Mach 5, and *Turbo 64* come with wedges that permit single-stroke commands in place of more elaborate Basic conventions. FastLoad and *Kwik-Load* include utilities that allow you to edit disks by track and sector. FastLoad has a built-in machine language monitor and copy program. The extras you get with Mach 5 are an extremely useful disk organizing program and an extra 4096 bytes of memory for Basic programming. *Kwik-Load* includes a copy and utility package that is one of the fastest available. *Turbo 64* includes a boot program that can be added to disk programs as permanent loaders.

The wedges are a definite luxury on loads, saves, and commands. The Mach 5 wedge is particularly useful, as it offers two additional functions not usually found in one-stroke commands: a disabler of the harmful drive rattle of the 1541 and a screen dump to printer.

Looking at the enhancers individually, we evaluated them as follows:

Mach 5

At the top in speed, ease of use, and reliability was Mach 5. The additional 4096 bytes of memory it offers could be handy for Basic programmers who need an extra memory cushion for long programs.

Unquestionably, the biggest edge Mach 5 has on the competition is the disk organizer program that loads from a disk. The organizer will catalog all your programs alphabetically and store them by name on a data disk which can be read on screen or output to an 80-column printer.

FastLoad

Advanced programers will probably find FastLoad most appealing because of its built-in machine language assembly monitor, which is called up by a single keystroke. As noted, another bonus is a built-in copy program. FastLoad also has a lock and unlock file option.

We had some problems with FastLoad, which is now in its fourth incarnation. The first version was plagued with problems, not the least of which was an inability to execute saves. Epyx took no action to inform purchasers of this defect,

Illustration by Virginia Fitch

Drive Enhancers: Speed Comparison

	Unaided	FastLoad	Mach 5	Turbo 64	Kwik-Load
Protected Disks					
Paperback Writer	:36	:28	:28	:31	:28
Script 64	1:51	1:51	1:59	1:51	1:51
Trio Word	1:04	No Load	No Load	1:51	No Load
Trio File	1:12	No Load	No Load	1:12	No Load
Trio Calc	:47	No Load	No Load	:48	No Load
Scratchpad	1:13	1:15	1:16	1:16	1:12
Microillustrator	:51	:23	:26	:51	No Load
Songwriter	1:05	:20	:21	1:06	1:06
Sargon Chess	1:03	:21	:19	1:07	:19
Pole Position	:40	:26	:28	:27	No Load
Unprotected Disks					
Script 64	1:17	:18	:17	1:16	:17
Total Music 64	:23	:07	:05	:07	:07
Lemonade	:35	:09	:09	:09	:08
Format a blank disk	1:20	1:26	1:18	1:36	:14
Save a full WP file	2:10	2:09	1:54	2:09	2:09

though it will exchange a copy of the original cartridge for an updated version on the purchaser's initiative.

Kwik-Load

Kwik-Load is a disk that we recommend more for its utilities than for its speedup abilities, though it did perform well on Basic programs. We were able to copy *Kwik-Load* to unprotected disks, so we could load them faster with an "embedded" boot.

As noted, the speed of its utility is truly remarkable. Kwik-Copy formatted a blank disk in 15 seconds, compared to 90 seconds for all the other utilities. Also included is a utility to time the speed of a disk drive.

We should point out that the speed of Kwik-Copy can create some unexpected hazards. You can easily erase your source

Drive Enhancers: Feature Comparison

Product Name	FastLoad	Mach 5	Turbo 64	Kwik-Load
Manufacturer	Epyx, Inc. 1043 Kiel Ct. Sunnyvale, CA 94089 (408) 709-1202	Access Software 2561 South 1560 West Woods Cross, UT 84087 (800) 824-2549	MegaSoft Ltd. P.O. Box 1080 Battle Ground, WA 98604 (206) 687-5116	Datamost 20660 Nordhoff Chatsworth, CA 91311 (818) 709-1202
Medium	Cartridge	Cartridge/Disk	Disk	Disk
Price	$39.95	$34.95	$19.95	$19.95
Loads	Protected & unprotected	Protected & unprotected	Protected & unprotected	Unprotected only
Wedge?	Yes	Yes	Yes	No
Copy Program?	Yes	No	No	Yes
Edit Disk?	Yes	No	No	Yes
Utilities	ML Monitor Lock file Unlock file Rename file Delete file Format disk	Disk Organizer Basic+4K memory Disable rattle Screen dump Rename disk Format disk	Boot Maker Delete file Format disk	Speed Check Validate disk Rename disk Delete file Alphabetize directory Rename file Format disk

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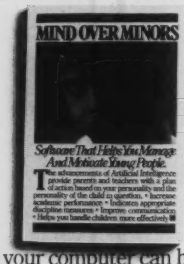

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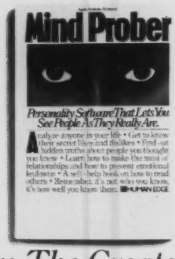

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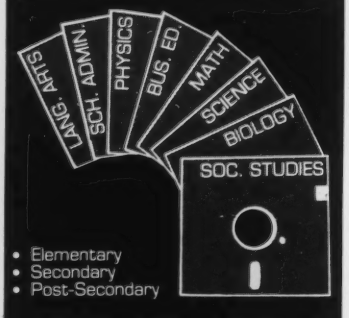

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CIRCLE 130 ON READER SERVICE CARD

COMMODORE'S PORT

disk, or even the *Kwik-Load* program disk itself, if you are not alert. If you plan to use the copy feature, you should put a write-protect tab on your source disk and on the program disk the moment you remove it from the box.

Overall, we found this program an exceptionally good value at $19.95.

Turbo 64

Turbo 64, on the other hand, we found virtually useless. Not only did it fail to gain any speed on most loads, but it failed to load itself most of the time.

To use it, you must allocate the program to a portion of unused memory. This is frequently a matter of guesswork, though some hints are included in a menu that suggests where to assign the loader. If you pick the wrong memory location, your load "hangs," and you must try again—nullifying any time saving.

More annoying, you cannot use "*" to load a program. Since most commercial software is loaded with this convention, it took a good deal of detective work to find the name of a program that would instigate a load.

The *Turbo 64* wedge loads separately in 13 seconds from the same disk. When it worked, which was about half the time, the wedge permitted single-stroke commands for load and load-and-run of Basic programs, and load of machine language programs.

1541 Flash

One enhancer that we had heard could boost speeds under program control was 1541 Flash from Skyles Electric Works. We were unable to evaluate this product fully because of its complexity. 1541 Flash is a package of ROM replacement chips and connector cables which require installation within the C64 and 154 by prying the kernal ROM out of the computer and the operating ROM from the drive. You must also bend one of the pins of the input chip. This is an operation that not only voids the Commodore warranty but, if not performed correctly, could cause permanent damage to the computer or drive.

Our evaluation was that the few seconds that might be saved by installing this product just weren't worth the potential hazards.

Our recommendations for speeding up a 1541 drive: Mach 5 for its reliability and its outstanding disk organizing program. FastLoad as a second choice if you are interested in machine language programming. Whichever you choose, we recommend *Kwik-Load* as an adjunct for its copy and utility programs. ■

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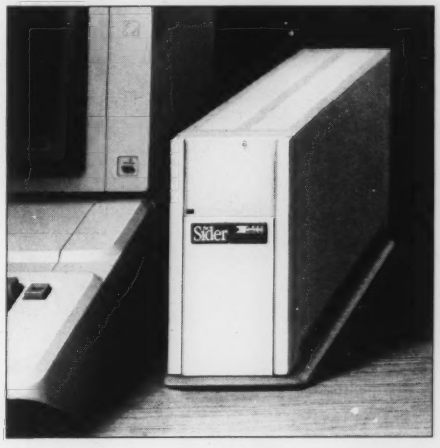

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CIRCLE 109 ON READER SERVICE CARD

OUTPOST: ATARI

Ma Bell eyes ST; graphics software; and Logo programs/**John J. Anderson**

We are happy to report that although the Atari ST remains in short supply in some areas, the machines are now shipping in earnest. Sales will probably not meet the projections Atari made last summer, simply because most target dates were so badly missed, but the ST is selling. Our informal survey has also shown the machines to be highly reliable on the whole, with a very low return rate. The hardware is cast, and well cast. Now the story of the Atari ST series has become one of software.

Reach Out and OEM Someone

One of the more interesting stories circulating at press time is that none other than AT&T, the widowed Ma Bell, is taking a close look at the ST, with an interest in the possibility of marketing the machine under its own label. This would indeed make for strange bedfellows, as they say, but the potential in such an arrangement would be quite strong. Atari would gain the infusion of cash it needs to capture a substantial market share, while AT&T would gain an extremely aggressively priced workhorse with eventual Unix capability. We'll keep you posted.

Quality software for the machine remains a rare commodity, but professional software development seems to have reached a reasonable pitch, and it is fair to project that at least a dozen good titles will be available before the end of the year. These range from word processors, spreadsheets, and terminal packages to arcade and adventure games.

ST Art

If you saw last month's issue, you may have noticed that our computer image of Halley's Comet was produced on an Atari ST. It was created with a beta test version of *Degas*, a superb menu-based ST graphics package from Batteries Included. The program allows for sophisticated graphic design in all three screen resolutions. In hi-res monochrome, it is quite reminiscent of *MacPaint*, while offering a full-screen window—something *MacPaint* cannot do. In lo-res and hi-res color, the package allows for crisp, clean displays without color bleed or "jaggies."

We were impressed as it was, then called to find out where the retail price had been set. When Marty Herzog of Batteries told us it would cost only $39.95, we were floored. *Degas* sets an early standard for ST software price/performance: we can only hope its challenge of quality is met by the other packages soon to emerge for the ST from other developers.

Degas sets an early standard for ST software price/performance.

Basic No Go Means ST Logo

We are disappointed to report that as of press time, ST Basic was still unreleased. We have it on unimpeachable authority, however, that the final wrinkles in the package are very nearly ironed out, and it will hit the streets "real soon now." Fortunately, ST Logo is proving to be a very capable language, and grass root efforts in Logo are beginning to roll in.

One of them is from our friend Michael Squire and is reproduced here as Listing 1. It is a modified version of the animated dragon program by Jim Muller that originally appeared in our September 1984 Logo column.

This program and other ST programs are available on *Creative Computing* Online (PCS-22), as well as ATARISIG (PCS-132), via CompuServe. A couple of capable terminal programs are also available on the ATARISIG, but there is a Catch-22 involved—you need a download-capable terminal package to download a download-capable terminal package. The VT-52 emulator ST owners already have in TOS works just fine, but does not offer upload/download capability. Michael recommends *PC/Inter Comm*, from Mark of the Unicorn, which he used to put up his programs. It offers both capabilities under the popular error-checking protocol known as XMODEM.

If, by the way, you would like to communicate with Michael via CompuServe, his PPN is 75236, 2640.

TOS the ROM

Where, you may justifiably query, is TOS in ROM, those six little chips that will free up all 512K RAM of the ST for better things than cacheing GEM from floppy disk? Well we are told by Atari that they have finally frozen the program modules, and that the ROMs themselves will be available in about six to eight weeks. Cost of the upgrade will be in the neighborhood of $20—very reasonable indeed. Once TOS is in ROM, the ST will boot up much faster, and have twice as much RAM available for the user. Atari has tried hard to make sure that the version of TOS it will burn into ROM is as capable and bug-free as possible. Hence the delay—understand?

The Readers Strike Back

I have already received several letters concerning my review of the Atari ST, most of it taking me to task for one or another of the negative comments at the tail end of my discussion. As a general reply, let me say that I did not mean to imply that GEM is in any way an inferior environment—simply that I found it to be inferior to that of the Macintosh. I am aware that because something works differently from the Mac, does not automatically make it worse. I tried to sublimate my Mac habits when evaluating GEM and think that even those who are not familiar with the Mac would probably agree with the bulk of my evaluations, positive and negative. GEM represents a worthy effort, and if I did not state that clearly enough in my original review, I will state it here.

As for the fact that menus drop-down without the need to click, I assure you that the Macintosh approach, necessitating a click, is preferable. This is not just a matter of Mac habit—it is the smoother way to work things. I state in the original review that this is an error that could be easily corrected. I am not saying

that GEM is full of bugs, or that it reflects shoddy programming. I just wish the designers would consider that "point-and-click" means you must click after you have pointed. Too many times have I dropped a menu I didn't need. Call me a klutz, but I won't back down on that one.

Then there was the matter of the power switch on the drives. I'll admit it. It probably bothered me because I am out of practice with externally-powered disk drives. But wouldn't it have been nice if there was even a tiny little power light on the front?

To those of you totally satified with the feel of the ST keyboard, yes, it is indeed a matter of taste. I like a keyboard with a harder feel. If you don't, the ST keyboard is perfect for you.

Finally, on the matter of external power supplies: I realize that they allow the machine to run cooler and enable the ST to sport its rakish design. I have nothing against them in principle, other than the fact that they can be inconvenient. At least they don't have their plugs grafted directly to the transformer box, like so many power adaptors we've seen. Those either hog two sockets or dangle precipitously over the power toggle when plugged into a power strip.

But the Atari ST power supplies are not of the sturdiest variety, and that concerns me. One of mine suffered a fall from the back of the desk to the floor and I heard something come loose as it hit. It still works, but now the power supply buzzes annoyingly when in use.

But hey, Atari fans, lighten up, okay? The ST is a terrific machine, and I said so—and will continue to say so. The eventual arrival of low priced, high quality software will prove the point. ■

Correction

There is a misprint in line 100 of Listing 3 in the October Outpost: Atari column. The correct line reads:

```
100 XP=159-X:YP=
191:GOSUB 31000
```

in which the number after the first equal sign has been corrected.

Listing 1.

```
TO PUFF.THE.DRAGON
CS HT PU
HOME
SETBG 0 SETPC 3
START
BODY
NECK
TAIL
LEGS
POINTS
WINGS
REPEAT 3 [CHEW CHEW CHEW BREATHE]
END

TO BODY
HALFCIRCLE 8
FORWARD 8
RIGHT 90
FORWARD 90
BACK 90
END

TO NECK
RIGHT 180
REPEAT 15 [FORWARD 5 LEFT 10]
REPEAT 12 [RIGHT 10 FORWARD 3]
LEFT 60
HEAD
SETH 0
FORWARD 5 LEFT 90
REPEAT 15 [TRI 4
FORWARD 4 LEFT 10]
REPEAT 12 [TRI 4
FORWARD 4 RIGHT 14]
END
```


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Listing 1. *(continued)*

```
TO TAIL
START
SETH 330
REPEAT 3 [FORWARD 5 RIGHT 10]
REPEAT 13 [TRI 5 FORWARD 5 LEFT 10]
REPEAT 11 [TRI 5 FORWARD 5 RIGHT 10]
LEFT 110 BACK 5 TRI 10
END

TO LEGS
START
SETH 90
TRI 15 FORWARD 8 TRI 15
FORWARD 64 TRI 15 FORWARD 8 TRI 15
END

TO START
PENUP
SETPOS [-25 -30]
PENDOWN
END

TO POINTS
START
SETH -60
REPEAT 7 [TRI 8 RIGHT 60
FORWARD 8 LEFT 50]
PENUP
REPEAT 5 [TRI 8 RIGHT 60
FORWARD 8 LEFT 50]
PENDOWN
REPEAT 6 [TRI 8 RIGHT 60
FORWARD 8 LEFT 50]
END

TO CHEW
PENUP
SETPOS [87.990674 51.767816]
SETH 0 HT
PENDOWN RIGHT 10
SHUT OPEN
END

TO HALFCIRCLE :N
REPEAT 7 [FORWARD :N RIGHT 10]
PENUP
REPEAT 5 [FORWARD :N RIGHT 10]
PENDOWN
REPEAT 6 [FORWARD :N RIGHT 10]
END

TO HEAD
UPPER.JAW
RIGHT 10
LOWER.JAW
END

TO TRI :N
REPEAT 3 [FORWARD :N RIGHT 120]
END

TO SHUT
SETPC 3
PENUP
LOWER.JAW
LEFT 21.5
PENDOWN
SETPC 3
LOWER.JAW
END

TO LOWER.JAW
RIGHT 180 FORWARD 13.899992
LEFT 100 FORWARD 40
LEFT 160 FORWARD 40 RIGHT 80
END

TO UPPER.JAW
FORWARD 15 RIGHT 94
FORWARD 45 RIGHT 86
FORWARD 9 RIGHT 86
FORWARD 45 RIGHT 94
EYE
NOSTRILS
PENUP
SETPOS [87.990789 51.76783]
PENDOWN
END

TO NOSTRILS
PENUP
SETPOS [124 65]
PENDOWN
CIRCLE [124 65 3]
END

TO EYE
SETPC 2
PENUP SETPOS [94 60] PENDOWN
CIRCLE [94 60 4]
CIRCLE [94 60 3.5]
CIRCLE [94 60 3]
SETPC 1
PENUP SETPOS [97 60] PENDOWN
CIRCLE [97 60 2]
CIRCLE [97 60 1.5]
CIRCLE [97 60 1]
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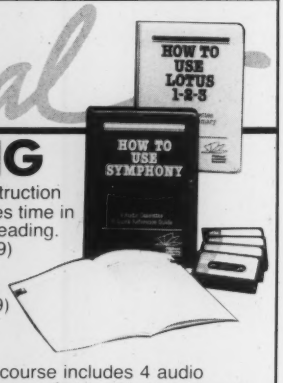

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Listing 1. *(continued)*

```
SETPC 0
CIRCLE [97 60 0.5]
SETPC 3
END

TO FLAME
FORWARD 50
SETPC 0
BACK 50
SETPC 3
PENDOWN
END

TO TIP
REPEAT 10 [FORWARD 1 LEFT 18]
FORWARD 30 BACK 20
LEFT 180
END

TO WINGS
PENUP
SETPOS [40 -5]
SETH 0
PENDOWN
REPEAT 6 [FORWARD 8 LEFT 5]
FORWARD 40
REPEAT 6 [TIP]
BACK 20 LEFT 180
REPEAT 7 [FORWARD 3 LEFT 10]
END
```

```
TO SMOKE
PENUP
SETPOS [127 65]
SETH 30
PENDOWN SETPC 1
FORWARD 12
SETPC 0 BACK 12
SETPC 3 PENDOWN
NOSTRILS
END

TO FIRE
PENUP
SETPOS [87.990808 51.76784]
SETPC 1 PENDOWN
SETH 95
FLAME
END

TO BREATHE
REPEAT 5 [FIRE RIGHT 5 FIRE LEFT 5]
REPEAT 8 [SMOKE]
END
```

```
TO REMARKS.TXT

; ***********************************
; * DRAGON.LOG
; *
; * THE SET OF PROCEDURES CONTAINED
; * IN THIS FILE COMES FROM THE
; * SEPTEMBER 1984 ISSUE OF
; * "CREATIVE COMPUTING" MAGAZINE
; * AND IS TO BE FOUND ON PAGES
; * 182-183. THE MODIFICATIONS TO
; * THE PROCEDURES CONTAINED IN THE
; * MAGAZINE REQUIRED TO BE ABLE TO
; * RUN IT SUCCESSFULLY ON AN ATARI
; * 520ST USING (16-BIT) ATARI LOGO
; * WERE WRITTEN BY MICHAEL A.
; * SQUIRE, A MEMBER OF THE DAYTON
; * (OHIO) ATARI USERS GROUP
; * (DATARI), ON AUGUST 12, 1985.
; *
; ***********************************

END

TO OPEN
SETPC 3 LOWER.JAW
SETPC 0 RIGHT 180 FORWARD 13.899987
LEFT 100 FORWARD 40
SETPC 3 PENDOWN LEFT 160 FORWARD 40
RIGHT 80 PENUP
RIGHT 21.5 PENDOWN SETPC 3 LOWER.JAW
END
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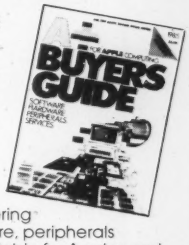

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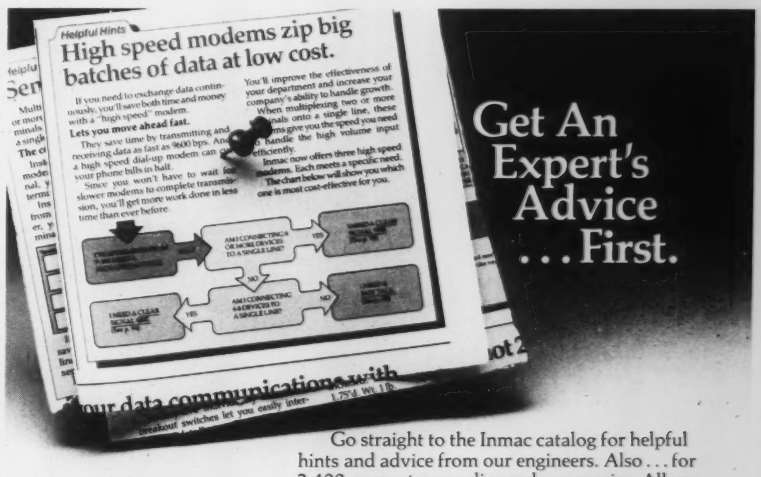

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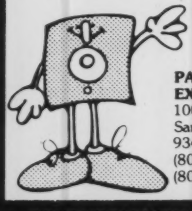

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Apple II Series (II, IIc, IIe)	B.	M.	X.
Apple Macintosh	C.	N.	Y.
Commodore 64 or 128	D.	P.	Z.
Commodore Amiga	E.	Q.	1.
Atari XL, XE, ST	F.	R.	2.
Tandy/Radio Shack	G.	S.	3.
Any Laptop/portable	H.	T.	4.
Other (specify)	J.	U.	5.
None	K.	V.	6.

Please indicate which of the following peripherals you plan to buy either in the next 6 months or in the next 7-12 months.

	3. Plan to Buy	
	1-6 months	7-12 months
Hard disk drive	7.	14.
Dot matrix printer	8.	15.
Daisy wheel printer	9.	16.
Plotter	10.	17.
Monitor	11.	18.
Modem	12.	19.
Power protection device	13.	20.

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CC 12852

4. Where do you use a computer?
21. ☐ Business 22. ☐ Home 23. ☐ School

5. How many computers do you own?
24. ☐ 1 25. ☐ 2-3 ☐ 26. ☐ 3 or more

PLEASE PRINT CLEARLY—Use only one card per person

NAME_____ PHONE # (_____)_____

COMPANY_____ TITLE_____

ADDRESS_____ APT._____

CITY_____ STATE_____ ZIP_____
(Zip code must be included to insure delivery.)

Please indicate which of the following microcomputers you currently own and/or plan to buy in the next year. Then, for each one that you plan to buy, please indicate when this purchase will most likely be made.

	1. Own	2. Plan to Buy	
		1-6 months	7-12 months
IBM PC or compatible	A.	L.	W.
Apple II Series (II, IIc, IIe)	B.	M.	X.
Apple Macintosh	C.	N.	Y.
Commodore 64 or 128	D.	P.	Z.
Commodore Amiga	E.	Q.	1.
Atari XL, XE, ST	F.	R.	2.
Tandy/Radio Shack	G.	S.	3.
Any Laptop/portable	H.	T.	4.
Other (specify)	J.	U.	5.
None	K.	V.	6.

Please indicate which of the following peripherals you plan to buy either in the next 6 months or in the next 7-12 months.

	3. Plan to Buy	
	1-6 months	7-12 months
Hard disk drive	7.	14.
Dot matrix printer	8.	15.
Daisy wheel printer	9.	16.
Plotter	10.	17.
Monitor	11.	18.
Modem	12.	19.
Power protection device	13.	20.

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481 482 483 484 485 486 487 488 489 490 491 492 493 494 495 496 497 498 499 500

Void after February 28, 1986

CC 12851

4. Where do you use a computer?
21. ☐ Business 22. ☐ Home 23. ☐ School

5. How many computers do you own?
24. ☐ 1 25. ☐ 2-3 ☐ 26. ☐ 3 or more

PLEASE PRINT CLEARLY—Use only one card per person

NAME_____ PHONE # (_____)_____

COMPANY_____ TITLE_____

ADDRESS_____ APT._____

CITY_____ STATE_____ ZIP_____
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Take advantage of special holiday savings on our deluxe RS-232 Program Pak for only $59.95 (26-2226, Reg. $79.95). It lets you communicate with information services and other computers—just add the DCM-3 telephone modem (26-1178, $59.95). The DCM-3 plugs into any modular phone jack.

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